

MARCH

1918

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THE AGRICULTURAL GAZETTE OF CANADA

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SEED SUPPLY FOR CURRENT
YEAR

DUSTING VERSUS LIQUID
SPRAYING

WAR-TIME POULTRY
RATIONS

VOCATIONAL TRAINING IN
AGRICULTURE

HYDRO-ELECTRIC POWER
ON THE FARM



DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

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March, 1918

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of
THE HON. THOS. ALEXANDER CRERAR
Minister of Agriculture

OTTAWA
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1918

CONTENTS

	Page
Contents.....	219
Seed Supplies and Distribution.....	221
Canada Food Board.....	223
Officers of Board.....	224
Purchase of Tractors.....	224
Neat Cattle Duty Free.....	224

PART I.

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
Assistance Given by the Experimental Farms Branch to Farmers in Securing Good Seed, by J. H. Grisdale.....	225
Dusting vs. Liquid Spraying, by W. S. Blair.....	226
The Division of Apiculture:—	
The Canadian Honey Crop, 1917, by F. W. L. Sladen.....	227
The Division of Horticulture:—	
Root Seed Production a War Measure, by M. O. Malte.....	228
The Poultry Division:—	
War Time Rations for Laying Hens, by F. C. Elford.....	230
The Cereal Division:—	
New Cereals, by Dr. Chas. E. Saunders.....	231
The Entomological Branch:—	
Dusting vs. Liquid Spraying in Quebec, by E. C. Petch.....	231
The Predacious Mite Shimer and Its Relation to the Natural Control of the Oyster Shell Scale, by John D. Tothill.....	234
Making Bordeaux Mixture, by G. E. Saunders.....	239
The Seed Branch:—	
Seed Tests Made in January, by E. D. Eddy.....	240
The Health of Animals Branch:—	
Swine Importation Regulations.....	241
The Dairy and Cold Storage Branch:—	
The Cheese Commission, by J. A. Ruddick.....	242
The Live Stock Branch:—	
Regulations to govern Stockyards.....	244

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Seed Supply for Current Year:—	
Prince Edward Island, by W. J. Reid.....	245
Nova Scotia, by M. Cumming.....	245
New Brunswick, by W. R. Reek.....	246
Ontario, by W. Bert Roadhouse.....	247
Manitoba, by T. J. Harrison.....	249
Saskatchewan, by W. P. Tullis.....	251
Alberta, by Jas. McCaig.....	252
British Columbia, by H. O. English.....	253
Dusting vs. Liquid Spraying:—	
Quebec, by Georges Maheux.....	254
Oka Agricultural Institute, by Rev. Father Leopold.....	254
Ontario, by W. F. Kydd.....	259
Ontario Agricultural College, by L. Caesar.....	260
War Time Poultry Rations:—	
Quebec:	
Macdonald College, by M. A. Jull.....	262
Ontario, by W. R. Graham.....	264
Manitoba, by M. C. Herner.....	265
British Columbia, by J. R. Terry.....	267
Allotment of Agricultural Education and Research:—	
Nova Scotia, by M. Cumming.....	267
New Brunswick, by W. R. Reek.....	267
Quebec, by J. Antonio Grenier.....	268
Ontario, by W. Bert Roadhouse.....	268
Manitoba—Inspector's Committee—Boys' and Girls' Clubs, by R. Fletcher.....	269
Saskatchewan.....	271
Alberta, by Jas. McCaig.....	271
British Columbia, by L. S. Klinek.....	272

Nova Scotia:—	
Agricultural Instruction Activity, by J. G. Archibald.....	273
New Brunswick:—	
Farmers' Co-operative Creamery Company, by W. R. Reek.....	274
Ontario:—	
Butter Grading in 1917, by John H. Scott.....	275
The Potato Extension Scheme, by Justus Miller.....	277
Profit Competitions for 1918.....	280
Farmers' Week at Kemptville Agricultural School, by W. J. Bell.....	281
Short Courses in Agriculture and Domestic Science, by J. W. Stark.....	282

Saskatchewan:—	
A New Live Stock Commissioner.....	283

Alberta:—	
The Co-operative Marketing of Poultry Products, by J. H. Hare.....	284

PART III

RURAL SCIENCE

Alberta:—	
The Variation in Elementary Courses in Agriculture, by Jas. McCaig.....	286
Manitoba:—	
Consolidation of Schools and Agricultural Education, by S. E. Lang.....	287

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, PUBLICATIONS AND NOTES

Vocational Training in Agriculture:	
The Means Adopted in the United States Compared with the Objects Aimed at by The Agricultural Instruction Act in Canada.....	289
Hydro Electric Power on the Farms, by J. W. Purcell.....	292
Baby Beef Contests for Boys and Girls.....	298
Associations and Societies:	
Live Stock Breeders' Week in Toronto.....	299
Seed Supplied by the Canadian Seed Growers' Association.....	302
Canadian Co-operative Wool Growers' Limited.....	303
Nova Scotia Farmers' Association.....	304
The Holstein Record.....	304
The Ontario Corn Growers' Association—Standards for Corn.....	305
Central Canada Veterinary Association.....	305
Ontario Milk and Cream Production Association.....	305
Ontario Ploughmen's Association.....	305
The Month's Meetings.....	306
The Manitoba Dairy Association.....	306
Saskatchewan Agricultural Societies.....	306
Saskatchewan Poultry Breeders' Association.....	307
United Farm Women of Alberta.....	307
Alberta Provincial Poultry Association.....	307
Prince Edward Island Egg and Poultry Association.....	307
New Publications.....	308
Notes.....	309
Index to Periodical Literature.....	311

PART V

INTERNATIONAL INSTITUTE OF AGRICULTURE

Science and Practice of Agriculture.....	312
Crops and Cultivation.....	312
Live Stock and Breeding.....	315
Farm Engineering.....	319
Agricultural Industries.....	320
Plant Diseases.....	326
Injurious Insects.....	327
Agricultural Economics.....	327
Contents of the Institute Economic Bulletin.....	327
Agricultural Statistics.....	328
Crop Conditions in England and Wales, Jan. 1, 1918.....	328
Numbers of Live Stock in the United States.....	328
Broomhall's Foreign Crop Cable.....	328

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OF CANADA

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MARCH, 1918

No. 3

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SEED SUPPLIES AND DISTRIBUTION

THE seed situation in Canada in its relation to crop production in 1918, was, on due investigation by the Seed Commissioner, found to warrant the continuation in active operation of the Seed Purchasing Commission that last year insured a supply of the seed of wheat, oats, and barley. This year, the Commission is extending its operations to include peas and beans.

Seed of cereal grains is this year being purchased in the Prairie Provinces and in Ontario. Supplies are assembled in the Canadian Government elevators at Calgary, Saskatoon, Moose Jaw, Transecona, Port Arthur, and Quebec, where they are cleaned ready for distribution in carload lots either in bulk or in sacks, as required. The head office of the seed Purchasing Commission for the west of Canada is in the Post Office Building, Regina, Sask., and for the east of Canada in the Post Office Building, Quebec City. The sale and distribution of seed peas and seed beans are controlled by the agent of the Seed Purchasing Commission, Department of Agriculture, Ottawa.

The main purpose of the Commission is to guard against possible seed shortage by purchasing and holding in store supplies of food grains that may safely be used for seeding purposes. Its operations do not interfere unduly with the business of seedsmen, since the Commission does not handle named varieties of seed grains, with the exception of a commercial grade of Marquis wheat. All of the grains purchased for seed is obtained subject to inspection as to definite standards of quality for seed grades.

The Commission has been able to procure an abundant supply of Marquis wheat of good quality to take care of estimated requirements. They have had difficulty in getting supplies of oats suitable for seed, and have had repeatedly to lower the standards of quality in respect to the prevalence of wild oats, and to increase the premiums over current market values in order to get delivery of oats that might be considered at all suitable for seed. The same difficulties have been met with in respect to seed barley.

Because of weather conditions during 1916 and the spring of 1917, the area devoted to peas in Eastern Canada became very much reduced. In consequence, the price of peas has continued abnormally high. At \$4.00 per bushel, paid to farmers for uncleaned peas, this grain is too expensive for feeding to live stock for animal products production. Peas have consequently been in demand almost entirely for human food and for seed. As the world's supply of meat becomes further decreased, the demand for food grain rich in protein, such as peas and beans, will undoubtedly increase. A substantial supply of seed peas has been purchased, and is now held in reserve by the Seed Purchasing Commission.

SHORTAGE OF BEANS

In large part, because of weather conditions, the bean crop of Ontario has been a partial failure during each of the last two years, and at the present time it is difficult to obtain seed beans in the bean areas of Ontario and Quebec that are free from anthracnose, and are otherwise suitable for holding in reserve for seeding. It has been possible to secure a limited quantity of seed beans free from disease from the Okanagan Valley in British Columbia, and these will be made available for planting in the bean districts in Eastern Canada.

The Seed Purchasing Commission is not operating for the purpose of making profit. The prices fixed for the sale of seed grain held by the Commission are calculated to cover the net cost of the re-cleaned seed so far as it is possible to determine that cost.

FIELD ROOT AND GARDEN SEEDS

The situation in respect to field root and garden seeds has become acute, not only throughout North America, but in parts of Europe from which these seeds were formerly

imported. Indeed, at the present time, Europe is looking to Canada for supplies of some of these seeds that were formerly exported. Arrangements for production have to be made two years in advance. It is not reasonable to expect that Canadian farmers will grow these seeds unless they have an order in advance, because when produced the seeds cannot be used for any other purpose. The wholesale prices for these seeds now range as high as ten times the normal, and at these prices seed merchants are disinclined to place contract orders for more than their estimate of bare requirements. This condition leads to further difficulties in respect to seed shortage. To help to overcome these difficulties, the Dominion Experimental Farms Branch has undertaken the production of fifty per cent. of Canada's requirements of those field roots and garden seeds that were formerly imported from Europe. In addition, the Board of Governors of the University of British Columbia, in agreement with the Government of British Columbia, has undertaken the war-time emergency production of practically the remaining half of Canada's requirements. This work has been allotted to Professor L. S. Klinck and his staff of the Agricultural Department of the University. Dean Klinck is now in a position to receive requisitions for seed supplies from any seed house, and arrange for the production and inspection of seed crops among British Columbia growers. To further support him in this work, the Minister of Agriculture has undertaken to accept delivery at the Canadian Government elevator at Vancouver on or before the thirty-first day of January, 1920, of the following kinds and quantities of these seeds re-cleaned at the prices set opposite each:—

The Seed	lb.	Price per lb.
Mangel.....	300,000	25c.
Sugar beet.....	150,000	25c.
Garden beet.....	100,000	40c.
Swede turnip.....	300,000	35c.
Fall turnip.....	50,000	35c.
Garden turnip.....	20,000	40c.
Rape.....	200,000	8c.
Field carrot.....	3,000	50c.
Garden carrot.....	7,500	60c.
Parsnip.....	5,000	25c.
Radish.....	50,000	40c.
Onion.....	10,000	1.00
Lettuce.....	2,500	50c.
Cabbage.....	15,000	1.50
Celery.....	1,000	1.50

In view of the present and prospective prices of these seeds, and the fact that growers will have the privilege of selling at any price which they can obtain, it is not contemplated that it will be necessary for the Department of Agriculture to take delivery of any considerable quantity of such seeds.

DATA BEING GATHERED

In order to obtain accurate data as to supplies of seeds available in Canada, the Minister of Agriculture has taken authority under the War Measures Act to require seed merchants promptly to supply accurate information regarding grasses, clovers, forage crops, field roots, and garden seeds of all kinds, respecting stock in hand, total receipts for the year, and arrangements for production for

the ensuing year. This information is being collected concurrently in Canada and the United States, and the total when obtained, indicating shortages and surplus of each kind, will be published.

Canadian farmers and gardeners have no occasion for serious alarm as to seed supplies for the ensuing season. They may suffer considerable inconvenience because of being unable to procure particular varieties, or because of difficulties of transportation in getting their seed supplies. Difficulties in respect to seed supplies are expected to be more pronounced for the planting of 1919. Since the outbreak of the war, repeated intimations have been given through the media of press articles, and otherwise, that farmers and gardeners should carefully preserve a supply of the best specimens of field and garden roots, and transplant them early in the spring to produce seeds for themselves and to spare for their locality. Unfortunately, this has been done to a very limited extent, and is not apt to be done by many farmers or gardeners during the ensuing season. The larger efforts now being made by the Experimental Farms Branch and the Province of British Columbia are expected to yield a seed supply sufficient to guard against a shortage for the spring of 1920.

THE CANADA FOOD BOARD

ON Monday, the 11th day of February, 1918, His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture, and under and by virtue of the powers in that behalf conferred on the Governor in Council by the War Measures Act, 1914, was pleased to order:

That a Board be created to be called The Canada Food Board;

That the said Board consist of a Director of Food Conservation, a Director of Food Production, and a Director of Agricultural Labour;

That the Board shall be under the jurisdiction of, and shall report to, the Governor General in Council through the Minister of Agriculture.

AND IT IS HEREBY FURTHER ORDERED:—

1. That the Board shall generally direct the production, conservation and distribution of food stuffs in the interests of Canada and the other British Dominions as well as the Allied Nations;

2. That all the powers and duties now vested in the Food Controller be transferred to and vested in The Canada Food Board, and that all relevant Orders in Council and regulations conferring powers or imposing duties upon the Food Controller shall have force and effect as if the Canada Food Board had been named and designated therein instead of the Food Controller.

3. That for the better accomplishment of the said purposes the Board shall have power:—

(a) To expend any sums of money approved by the Governor General in Council for any of the purposes aforesaid.

(b) To co-operate with the Provincial Governments with a view to co-ordinating the activities of all local bodies for the aforesaid purposes.

(c) To enter into agreements for the cultivation of idle land on such terms as may appear to the Board to be advisable.

(d) To utilize and direct the co-operation in the work of the Board of any member of the Outside Service for the purposes of publicity and of securing information.

(e) To mobilize and utilize on a voluntary basis the farm labour resources of Canada.

(f) To make such regulations consistent herewith for carrying out their duties and for the internal economy of the Board, as the Board may deem advisable.

OFFICERS OF THE BOARD

Following is a certified copy of a report of the Committee of the Privy Council, approved by His Excellency the Governor General on the 11th February, 1918:

The Committee of the Privy Council, with reference to the Order in Council of even date hereof, constituting THE CANADA FOOD BOARD, advise, on the recommendation of the Minister of Agriculture, that Henry B. Thompson be appointed Director of Food Conservation and Chairman of the Board; that Charles A. Dunning be appointed Director of Food Production; and that James D. McGregor be appointed Director of Agricultural Labour.

PURCHASE OF TRACTORS

Acting on the authority given in the foregoing Order in Council, The Canadian Food Board purchased at cost 1000 Ford tractors. These trac-

tors will be sold to Canadian farmers at the same price, plus the freight. In addition, option has also been secured on another thousand of the tractors. At present the Ford factories are engaged on an order for the British Government which it is anticipated will be completed by the end of March. Delivery of the Canadian tractors will then commence. The tractor is designed as a two-plough machine.

NEAT CATTLE DUTY FREE

His Excellency the Governor General in Council, under date of Feb. 8, 1918, on the recommendation of the Minister of Customs and under and by virtue of the power in that behalf conferred by The War Measures Act, 1914, or otherwise vested in the Governor General in Council, has been pleased to order as follows:—

During the period of one year from the seventh day of February, 1918, remission and refund of duty is hereby authorized in respect of neat cattle when imported by *bona fide* residents of Canada under regulations by the Minister of Customs.

TRACTION ENGINES DUTY FREE

His Excellency the Governor General in Council, under date of Feb. 8, 1918, on the recommendation of the Minister of Customs and under and by virtue of the power in that behalf conferred by The War Measures Act, 1914, or otherwise vested in the Governor General in Council, has been pleased to order as follows:—

During the period of one year from the seventh day of February, 1918, remission and refund of duty is hereby authorized in respect of traction engines costing not more than one thousand four hundred dollars in the country of production, designed to be moved by steam or other motive power for farm purposes, and parts thereof for repair; and traction attachments designed and imported—to be combined with automobiles in Canada for use as traction engines for farm purposes and parts thereof for repair.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

ASSISTANCE GIVEN BY THE EXPERIMENTAL FARMS BRANCH TO FARMERS IN SECURING GOOD SEED

BY J. H. GRISDALE, B. AGR., DIRECTOR OF EXPERIMENTAL FARMS

IT does not come within the scope of the work of the Experimental Farms Branch to arrange to supply farmers with seed, other than that produced on the farms themselves. It finds its work in this con-

cropped but also to extend the area over which such crops may be successfully grown.

The work in this line carried on year by year may be briefly described as follows:—



EXPERIMENTAL PLOTS OF WHEAT IN STOOK, EXPERIMENTAL STATION, ROSTHERN, SASK.

nection to lie in the endeavour to raise the standard of the seed used in Canada, to originate more productive and more hardy varieties, and hence, not only to increase the yield per acre of our staple field

Cereals.—From Ottawa a distribution of free samples of the purest seed of the best varieties is carried on every winter and spring. Thousands of samples are sent out annually. While these do not materially affect

the crop of the current year, they produce very significant results in the course of two or three years from the time the samples are given out.

In addition, at most of the Experimental Farms and Stations, a certain amount of high-class seed grain is produced every year for sale to the farmer at reasonable rates. This is intended to supplement, and not to interfere with, the business of the seedsmen.

In connection with the Illustration Station work, there is, as a rule, a considerable quantity of first-class seed grain which is disposed of at fair prices by the operators of the Stations.

Grasses and Clovers.—Efforts are being made to stimulate the production of clover seed in Quebec and of western rye grass and alfalfa seed in the West. Breeding work is being

carried on, having for its object the production of improved strains and better varieties.

Field Roots.—A shortage of field root-seed in 1919 having been foreseen, the Experimental Farms has arranged to produce, during 1918, a sufficient seed of mangels, swede turnips, field carrots, and rape, to supply a large proportion of the normal demand of the Dominion. The necessary stockings for this purpose were grown at ten of the Dominion Experimental Farms, and are now in storage ready for planting for seed production in the spring.

Potatoes.—A free distribution of samples of some of the best varieties of potatoes is carried on each year from Ottawa and from most of the branch Farms. Surplus stocks remaining after this distribution is provided for are sold to farmers at fair prices.

DUSTING VERSUS LIQUID SPRAYING

BY W. S. BLAIR, SUPERINTENDENT EXPERIMENTAL STATION, KENTVILLE N.S.

TESTS were conducted by the Experimental Station, Kentville, N.S., in 1917, to find out the relative efficiency of sulphur dust as compared with the regular lime-sulphur spray. Twelve trees were included in each plot. The sulphur dust, composed of 85 per cent finely ground sulphur, and 15 per cent arsenate of lead, was applied by using a machine which blew it on the trees in the form of dust. The lime-sulphur, made ac-

cording to the regular formula, 1 gallon of concentrate lime sulphur to 40 gallons of water, to which 2½ pounds of dry arsenate of lead was added to 100 gallons, was sprayed on the trees with the regular power spraying machine. Both applications were made on the same day, and uniform trees of the same varieties were used. Four applications were given, two before and two after bloom. The results obtained were as follows:—

Variety—Baldwin.	Per cent Clean	Per cent Scab	Per cent Insect Injury
How treated:			
Dust.....	97.5	1.85	.56
Sprayed.....	91.03	6.56	2.39
Not treated.....	79.93	12.24	7.80
Variety—Gravenstein.			
How treated:			
Dust.....	84.2	12.77	.28
Sprayed.....	80.02	14.60	.00
Not treated.....	33.29	63.81	.52

From the above it would appear that under the seasonal conditions of 1917, the dust was equally efficient a fungicide as the lime-sulphur. This, however, may not always hold true, and these results should not be considered conclusive. The dust spray gave a better control of canker

worm and other insects. The foliage injury was also less where the dust was used, the foliage on these plots being better during the summer than on the sprayed plots. The comparative cost of the two methods is given in the following table:—

	Dust	Spray
Total amount used on plot of 12 trees.....	84 lb.	210 gals.
Amount used per tree, 4 applications.....	7 lb.	17.5 gals.
Amount used per tree for 1 application.....	1.75 lb.	4.37 gals.
Total time required on plot of 12 trees.....	45 min.	210 min.
Time required per tree, 4 applications.....	3.75 min.	17.5 min.
Time required per tree for 1 application.....	.94 min.	4.37 min.
Total cost of material on plot of 12 trees.....	\$5.58	\$2.31
Cost of material per tree, 4 applications.....	.46	.19
Cost of material per tree for 1 application.....	.11	.04
Total cost of application on plot of 12 trees.....	.60	2.80
Cost of application per tree, 4 applications.....	.05	.23
Cost of application per tree for 1 application.....	.01	.05

Assuming 40 trees to the acre, which is a general average, the quantity required for an acre and the

time required to do the work, and cost of same for four applications, would be as follows:—

	Dust	Spray
Quantity used per acre.....	280 lb.	700 gals.
Time required to do one acre.....	2½ hrs.	11½ hrs.
Cost of material per acre.....	\$18.62	\$7.70
Cost of application per acre.....	2.00	9.33
Total cost.....	\$20.62	\$17.03

The sulphur-arsenate dust cost \$6.65 per 100 pounds. The lime-sulphur arsenate cost 1.125 cents per gallon. The concentrate lime-sulphur cost 20c. per gallon, the dry arsenate of lead 25c. per pound. One team and two men were employed and their time was charged at the rate of 80 cents per hour, 50 cents for team and man, and 30

cents for one man.

From the above it will be seen that it cost \$3.59 more to dust one acre than to spray it. The cost of material is very much greater where the dust is used, but this is offset by a much less cost in application. There is a great advantage in being able to do the work quickly, thus giving time for other important farm work.

THE DIVISION OF APICULTURE

THE CANADIAN HONEY CROP 1917

BY F. W. L. SLADEN, DOMINION APIARIST

INFORMATION received indicates that less honey than usual was produced in Canada in 1917, the principal cause being unsettled weather during clover bloom in Eastern Canada. The important producing region of Southern Ontario had almost an average crop of white

honey, the eastern part of this area having about the average, and the south-western part below the average. The buckwheat honey crop was not very large here. The province of Quebec had a short white honey crop, but the buckwheat crop was fair. The Maritime Provinces had

a short white honey crop, but in Nova Scotia fruit-bloom yielded well for one or two days. In most places in Northern Ontario the honey crop was a failure. In Manitoba, it was not much more than half the average. In British Columbia, the Interior valleys had a somewhat light crop owing to the very dry weather, but

on the lower mainland the yield per colony was high on account of the settled fine weather during clover bloom following a wet spring.

Most of the extracted honey was sold at from 2 to 5 cents per pound above last year's prices, but comb-honey advanced less.

THE DIVISION OF HORTICULTURE

ROOT SEED PRODUCTION A WAR MEASURE

BY M. O. MALTE, PH. D., DOMINION AGROSTOLOGIST

RIGHT from the outbreak of the war, the Dominion Experimental Farms realized that Canada was running a certain risk of having her supply of root seed from Europe curtailed, or even

Ottawa issued, early in the spring of 1915, a bulletin entitled "Field Root, Vegetable, and Flower Seed Growing in Canada," by M. O. Malte and W. T. Macoun.

In 1916, the root-seed situation—



PITS OF SWEDDE TURNIP STECKLINGS AT EXPERIMENTAL STATION,
KENTVILLE, N.S., LATE FALL, 1917

wholly cut off. In order to encourage root-seed growing in Canada for the purpose of offsetting a possible falling-off in the import from Europe, the Central Experimental Farm at

as it stood then, and as it threatened to develop should the war last much longer—was discussed in two issues of the *THE SEASONABLE HINTS*. Attention was called to the fact that

root-seed growing had been neglected in Europe during the season of 1915, and that, on account of threatening shortage in the supply, the chief root-seed producing countries of Europe had restricted their export of seed for the duration of the war. It was also pointed out, not only that certain varieties were already becoming scarce, or, in cases, could not be obtained at all, but also that, for the immediate future, seed of poor quality, and at high prices, would likely be brought on the Canadian market. For these reasons, farmers were sincerely urged to grow at least what seed they needed for their own use.

In 1917, the scarcity of root-seed, and the threatening shortage in the supply, were repeatedly brought to the attention of the public, through THE SEASONABLE HINTS and through press articles, and as a result a number of farmers arranged to grow their own seed.

However, when the situation was looked into from a commercial standpoint last year, it was found that arrangements had to be made to produce quite large quantities in order to safeguard an adequate seed supply for 1919 and coming years. The Dominion Experimental Farms were called upon to meet the emergency, and acted accordingly.

Large quantities of the best seed obtainable of swede turnips, mangels, carrots and rape were secured, and the necessary acreage arranged for, chiefly by the renting of land adjoining Experimental Farms and Stations, in Eastern Canada, and also in Alberta and British Columbia. The land was seeded in July to stockings, to be used for seed raising in 1918.

How many acres will be employed in root-seed growing the coming season, is almost impossible to tell accurately at present. The last summer was on the whole a very unfavourable one for root growing, the harvesting was made difficult, at least in Eastern Canada, on

account of continuous wet weather, and the winter has so far not proven very suitable for storing roots. However, if the remainder of the winter, and the early spring, prove to be reasonably normal, the Dominion Experimental Farms expect to have a total of about 350 acres planted to root seed next spring.

By far the largest areas will be planted in Eastern Canada. Turnip seed growing is planned for at the Central Experimental Farm, Ottawa, the Experimental Station, Charlottetown, P.E.I., the Experimental Station, Kentville, N.S., the Experimental Farm, Nappan, N.S., the Experimental Station, Fredericton, N.B., the Experimental Station, Ste. Anne de la Pocatière, Que., the Experimental Station, Cap Rouge, Que.

For mangel seed raising roots have been stored at the Central Farm, Ottawa, the Experimental Station, Charlottetown, P.E.I., the Experimental Station, Kentville, N.S., the Experimental Station, Lethbridge, Alta., the Experimental Station, Summerland, B.C., and the Experimental Farm, Agassiz, B.C.

Carrot seed raising has been provided for at the Central Experimental Farm, Ottawa, and the Experimental Station, Summerland, B.C. A small quantity of rape has been stored for seed raising at the Central Farm, Ottawa.

Granting that the estimated areas are planted for seed production the coming spring, and assuming that fair crops will be realized, the Experimental Farms expect to be in a position to bring on the market next fall considerable quantities of a class of seed which, it is feared, would otherwise be scarce, and consequently expensive. It should be clearly understood, however, that the seed production planned for next summer is strictly an emergency measure, made necessary by the war. It is a Government intervention for the purpose of providing the farmers

with a class of seed which, judging from the situation as it reveals itself at present, will be available

from normal pre-war sources in too small quantities to meet even very moderate demands.

THE POULTRY DIVISION

WAR-TIME RATIONS FOR LAYING HENS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

WAR prices and the fact that milling wheat is required for human consumption, make it necessary to revise from time to time poultry rations. The fluctuating prices, and the inability at times to get even feed wheat, corn, and other grains and mill feeds, make it impossible to lay down any hard and fast rule as to what to feed. This must be left to the individual feeder.

A good poultry ration is composed of two main characters of feed: the whole or cracked grain which is fed in a litter on the floor and for which the birds have to scratch; and the mash feed which may be fed in an open self feeding hopper or in a moist mash or in both ways. As a rule, the proportion in weight consumed of the two feeds is two of grain to one of mash, depending on the relative palatability and systems of feeding.

In addition to these two feeds, green feed, grit and shell should be given and also animal feed of some kind.

Add as much variety to the ration as possible; coarse grains mixed with feed wheat and corn make a good grain feed and for a mash ground oats alone or mixed with mill feeds answer very well. Feed the best you can get even if the desired variety and composition are not present. Results are not entirely dependent upon feed. Give the birds plenty of fresh air, clean quarters and do not stint the feed because it is not just what you want or high in price.

A suggested ration:—

GRAIN FED IN DEEP LITTER

One part oats, 1 part barley, 1 part feed wheat, 2 parts cracked corn.

Oats and barley are mostly home grown and can usually be obtained. The feed wheat and corn may not be so easy to get. If corn cannot be secured and buckwheat can, substitute one part of buckwheat for the corn. If corn, feed wheat and buckwheat are not obtainable use equal parts good barley and oats until other grains can be added.

Feed this morning and afternoon in litter so that the birds have to work for it.

MASH FED IN OPEN HOPPER OR IN A MOIST MASH AT NOON

One part bran, 1 part shorts, 2 parts ground oats and 1 part beef scrap.

At present beef scrap is very high and not always satisfactory. This may be substituted by a quantity of green bone, beef heads, etc., or, better, by skim or butter-milk given the hens to drink. In most cases on the average farm, milk will supply all the animal feed required, and in the backyard plants, the table scraps are sufficient.

Grit and shell should be before them all the time, and drink and green feed as they require it.

THE CEREAL DIVISION

NEW CEREALS

BY DR. CHAS. E. SAUNDERS, DOMINION CEREALIST

A new variety each of wheat and oats produced in this Division has been sufficiently tested to justify their introduction in agricultural practice.

The new wheat, which has been named Ruby, Ottawa 623, possesses characteristics in ripening and other qualities midway between Marquis and Prelude. It is beardless, possesses hard red kernels, gives a fair yield, and makes flour of the highest quality in regard to colour and strength. Bread made from it ranks in the first class. This wheat is the result of a cross between Downy Riga and Red Fife. Downy Riga was produced from two early sorts, Gehun, an Indian variety, and Onega from Northern Russia. Ruby is recommended for trial where Marquis does not ripen satisfactorily. A very limited distribution of five-pound samples is being made

to farmers requiring an early sort. A sufficient crop will be grown this year on the Experimental Farms to provide for a generous distribution next spring.

The new oat is a hulless variety named Liberty, Ottawa 480. It was produced by crossing Chinese Naked with Swedish Select. It is early ripening and possesses a stiff straw. It yields slightly less in weight of grain per acre than the standard varieties, such as the Banner, that is, when allowance is made for hull. Being hulless, this new oat should occupy a very important position in the feeding of young poultry and young pigs. For household use it requires only grinding in an ordinary chopping mill. This sort will be tried on a few farms this year. A sufficient acreage will be grown this season to provide for a distribution of seed samples in 1919.

THE ENTOMOLOGICAL BRANCH

DUSTING vs. LIQUID SPRAYING IN QUEBEC

BY C. E. PETCH, DOMINION ENTOMOLOGICAL LABORATORY, HEMMINGFORD, QUE.

THE experiments comparing the value of dusting and liquid spraying as methods of applying insecticides and fungicides were performed in the demonstration orchard of the Quebec Department of Agriculture at Havelock, Que. The conditions were as nearly similar as possible in the experiments on Fameuse trees, which touched each other, planted 33 feet apart each way.

It must be constantly borne in mind that the following results were obtained from one season's work in a single locality, and therefore, are not conclusive. However, even in the extremely wet season of 1917, dusting gave excellent results, and, if equal success could be attained in future years, it might replace liquid spraying in many commercial orchards.

At present with such a shortage of

labour, dusting will appeal to many growers, because it is a time-saver, as the following figures for a 10 hour day will show:—

	Acres.
Dusting machine and 2 men.....	32.2
Power sprayer with spray gun and 2 men.....	10.4
Power sprayer with bamboo poles and 3 men.....	8.6
Barrel pump and 2 men.....	3.6

Dusting is much more expensive than liquid spraying, and unless the cost of commercial mixtures is reduced 50 per cent., it will not be as economical. This objection could be largely overcome by purchasing a mixer and the raw materials and mixing them at home. The principal item, which could be utilized to reduce the cost, is the carrier or filler.

*Petch, C.E.—Carriers and Diluents for Dusting: 9th Ann. Report Quebec Society for the Protection of Plants from Insects and Fungous Diseases, p. 28.

The following prices were paid for materials, etc.: 90% sulphur, 10% lead arsenate dust, \$6.25 per cwt.; 45% talc, 45% sulphur, 10% lead arsenate dust, \$5.50 per cwt.; lime sulphur 13 $\frac{1}{8}$ cents per gal.; paste lead arsenate 11 $\frac{1}{4}$ cents per lb.; men, 25 cents per hour, horses, 7 $\frac{1}{2}$ cents per hour; machine expenses, 5 cents per hour. These prices made

the following average cost per tree for each application:—

	Cents
Dusting.....	14.46
Power sprayer and spray gun.....	5.77
Power sprayer and spray rods.....	5.94
Barrel pump.....	7.13

The applications were made on the same day when possible, and the plots received five applications as follows:—

DUSTED PLOT

Date	When applied	Weather	Mixture Used
May 21....	Leaf buds quite open..	Heavy rain 2 days later....	90% sulphur 10% lead arsenate.
June 2....	Blossom buds pink....	Heavy rain day following..	Same as for 1st application.
June 13...	Petals had fallen.....	Rain 2 days later.....	Same as for 1st and 2nd application.
July 14....	Apples well formed....	Light shower at night.....	45% sulphur, 45% talc, 10% lead arsenate.
Aug. 1....	.....	No rain for 7 days.....	Same as for application 4.

SPRAYED PLOT

Date	When applied	Weather	Mixture Used.
May 24....	Leaf buds quite open..	Heavy rain 2 days later....	Lime-sulphur 1.009 & paste arsenate lead 1 lb. to 15 gals. water.
June 2....	Blossom buds pink....	Heavy rain day following..	Same as for 1st application.
June 13....	Petals had fallen.....	Rain 2 days later.....	lime-sulphur reduced to 1.008; no change in the poison.
July 9....	Apples well formed....	Four fine days followed...	lime-sulphur reduced to 1.007; no change in the poison.
July 25....	.....	Three fine days followed...	Same as for 4th application.

No appreciable difference was observed in the foliage of either plot, except a few very scabby limbs in the sprayed area, which probably did not receive the last application. A small amount of burning was observed on the sprayed area, but the dusted foliage was not injured.

The examination of several thousand apples gave the following results:—

DUSTED	
Scab.....	3.8%
(scab spots very small)	
Apple curculio injuries.....	11%
Injured by other insects.....	12.8%

SPRAYED

Scab.....	1%
(apples from very scabby limbs not encountered in examinations)	
Apple curculio injuries.....	10.7%
Injured by other insects.....	8.6%

Results compiled from such examinations are generally not to be relied upon, because they do not represent the product ready for the market, but are formed from isolated examinations. According to the above figures, better results were obtained from liquid spraying than dusting, but the reverse was found

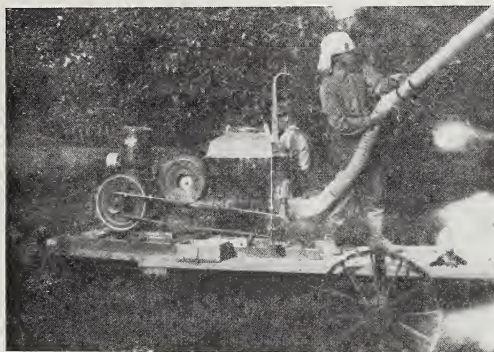
to be the case when the fruit was ready for the market.

DUSTED

No. 1 grade 21 barrels—	44.68%
No. 2 grade 17 barrels—	36.17%
No. 3 grade 9 barrels—	19.15%

SPRAYED

No. 1 grade 12 barrels—	35.3%
No. 2 grade 12 barrels—	35.3%
No. 3 grade 10 barrels—	29.4%



DUSTING MACHINE

Showing, from left to right: Engine, Blower, Hopper and Delivery Pipe. (Original)

SUMMARY

Dusting has many advantages over spraying under average conditions. Only a minute or two are required to refill the hopper on a dusting machine, whereas fifteen minutes are necessary for a tank, and fully an equal length of time is required to reach the water

supply and return to the orchard. When full, the sprayers weigh three or four times as much as the duster, which means considerable extra work for horses, especially on soft ground. The amount of work accomplished with the duster is more than three times as much as with sprayers, which is very important in wet seasons such as last summer. This reduction of time, also, means a big reduction in the cost of operating the machines. The spreading qualities of fine dust are greater than liquids, consequently, more thorough work would be expected from the use of the former in the hands of an inexperienced or careless worker.

A decided disadvantage of dusting is the higher cost, but this could be reduced considerably by mixing the materials at home. The dust is very irritating to the eyes, and it is probable any large amount

inhaled would be injurious owing to the presence of arsenic.

The results obtained with dust were more satisfactory than with liquids, but they are not conclusive; consequently, we do not feel in a position to recommend its general use.

THE PREDACIOUS MITE, *HEMISARCOPTES MALUS* SHIMER, AND ITS RELATION TO THE NATURAL CONTROL OF THE OYSTER-SHELL SCALE, *LEPIDOSAPHES ULMI* L.

BY JOHN D. TOTHILL, IN CHARGE OF NATURAL CONTROL INVESTIGATIONS

IF in the autumn or winter one turns over with a needle a few specimens of the oyster shell scale (*Lepidosaphes ulmi* L.) and looks at them with a pocket lens, tiny, pearly-white eggs will be found (Fig. 1). If the scales happen to come from orchard or other trees in eastern Canada, a closer examination will often show that not all of these pearly-white bodies are eggs, but that some of them are supplied with four pairs of minute legs. If brought into a warm room, these bodies supplied with legs begin to creep, and are seen to be full grown mites. A still closer examination will show that there are two kinds of these whitish mites. One of them, *Monieziella angusta* Banks, is longer than the other, and is supplied with claws on the end of its legs (Fig. 3), while the other, *Hemisarcoptes malus* Shimer, is turtle-shaped, and supplied with tarsal suckers instead of claws (Fig. 2). Each of these mites makes a living under scales, but each in a different way. The turtle-shaped *Hemisarcoptes* is a true predator, and lives on the fresh scale eggs; the longer and more sluggish *Monieziella* is a scavenger, and lives upon debris such as is left in the wake of the *Hemisarcoptes*. A recent study of material gathered from representative places throughout the Dominion has shown that in eastern Canada this predacious mite is by far the most important single factor in the natural control of the scale. A brief account of this useful little animal may be of interest.

The mite *Hemisarcoptes malus* Shimer, which attacks the eggs, though apparently of European origin, was first discovered in Ohio in 1868 and described by Shimer, who made a careful study of its habits,

and who clearly recognized its importance in the control of the scale. In France, it was rediscovered and described by Lignières, who likewise understood its function and significance. In Canada, Mr. T. D. Jarvis has specifically referred to the useful activities of this little animal at St. Catharines, Ontario. More recently, Messrs. H. E. Ewing and R. L. Webster have called attention to the usefulness of this mite at Ames, Iowa.

In discussing distribution it seems convenient to commence with the single tree and to pass by easy transitions to the question of continental distribution.

From an unsprayed apple tree at Fredericton, N.B., heavily infested with oyster-shell scale, and known to be moderately infested with the mites, collections were made from six main branches. From each of the six sets of twigs one hundred scales, containing 1916 eggs or egg remains, were examined under a binocular microscope for the mites. The mites were present on every twig, the lowest egg destruction being ten per cent and the highest twenty per cent; in no case was a scale found packed with mites, and dozens were found with one or two or three mites. Thus although the mite was rather scarce on the tree, it was scattered over it in very regular fashion. Such regularity in distribution on a single tree seems to be the general condition, and tends greatly to enhance the value of the organism as a factor in the control of the scale.

The mite evidently passes quite readily from tree to tree, perhaps through the medium of tree-visiting animals, such as birds, etc. The result is a comparative evenness of

distribution through orchards and districts. At Moncton, N.B., scale-infested twigs were examined from ten trees selected at random from the city and the surrounding two miles of country. In the case of each twig the turning of one hundred 1916 scales revealed the mite. Seven collections out of ten from various parts of Mount Royal, Quebec, revealed the mites. In twenty-one collections from trees in various

In the province of New Brunswick, scaly twigs were examined from Moncton, Nerepis, St. Stephen, Woodstock, Kingsclear, Fredericton, Chipman, and Chatham; the mite was found to be present in material found at the first six places and absent in material collected at the last two localities. Its presence at Moncton and absence at Chipman is interesting, because these places are a little less than sixty miles apart.

Finally, as to continental distribution, the mite is known to occur in Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Massachusetts, Ohio, Illinois, and Iowa. Efforts to secure oyster-shell scales from the prairie provinces have met with no success and in those places, probably owing to the scarcity of suitable food plants, the scale insect is evidently exceedingly scarce, if not entirely absent. A number of good collections of scale material have been examined from British Columbia, but so far the mite has not been discovered west of the mountains. Europe seems to have been the original home of the mite. To what extent it has followed the

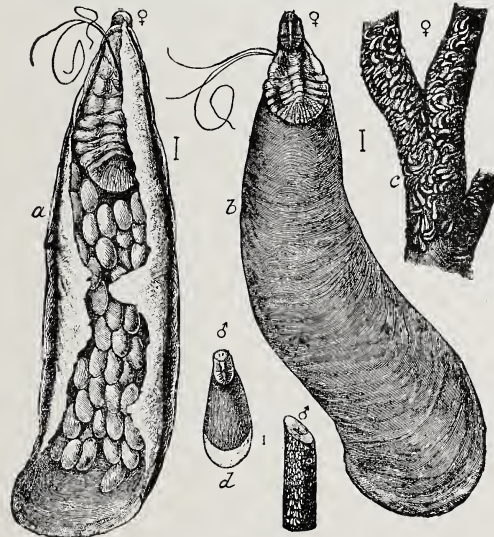


FIG. 1—OYSTER-SHELL SCALE

a, Female from beneath filled with eggs; b, same from above; c, twig infested by female scales; d, male scale and twig infested therewith. (After J. B. Smith)

places in and around the city of Fredericton, N.B., the mite was found to be present in seventeen cases, in none abundant enough to be controlling the scale, but entirely absent in only four cases. This fairly regular distribution, as at Fredericton, Moncton, and Mount Royal, seems to indicate the ability of the mite to spread rapidly from tree to tree. The same ability was indicated by finding the mite on a young thorn bush situated rather more than a hundred yards from the nearest possible source of infestation.

oyster-shell scale in its now almost world-wide distribution remains to be determined.

So far as I am aware, *Hemisarcoptes* has been recorded feeding only on oyster-shell scale and on San Jose scale, and my own observations are confined to its work on the former in Canada.

As soon as the eggs of the scale are deposited the mite begins to feed upon them. By glueing scales to cover glasses and depending them into cells, it is possible to observe this nonspectacular process. The

short proboscis is inserted through the egg shell, and as the contents are sucked slowly out the shell collapses. In experiments of this kind some mites would not feed at all, and others seemed to feed ravenously; in one case, six mites ate twenty-four eggs in ten days; in another, a large mite ate seven eggs in eight days.

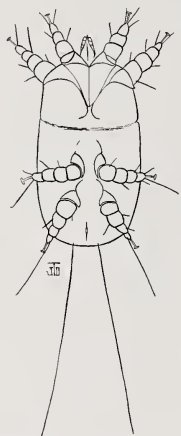


FIG. 2—*HEMISARCOPTES MALUS* SHIMER, ventral view. In Eastern Canada this mite is the most important single factor in controlling the Oyster-shell Scale. (Original)

The ability to feed upside down with apparently as great ease as when in the more normal position is due to the presence of long tarsal suckers, on the tips of which the mites walk, and to the long caudal hairs that adhere tenaciously to surfaces as slippery as polished glass. On glass slides, it was found that *Monieziella*, which has no tarsal suckers and much shorter caudal hairs, could not walk at all; *HemisarcOPTES*, however,—perched up, as it were, on tip toe—would walk quickly out of the microscopic field quite as actively on the lower surface of the slide as on the upper surface. In either case, the long caudal hairs were invariably dragged along the surface of the slide, and were never carried in the air. This ability to

walk on slippery surfaces is probably of considerable assistance in climbing young apple and thorn twigs.

Scaly twigs warmed up in the laboratory were frequently found with some of the adult mites migrating from one scale to another. When the mites have not had a meal for some time they are flat enough to crawl through a very slight opening usually found between the bark and the caudal end of the scale. In a few

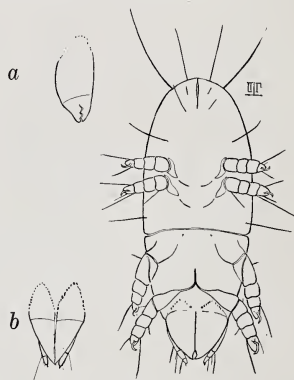


FIG. 3—*MONIEZIELLA ANGUSTA* BANKS, ventral view. A scavenging mite liable to be confused with *HemisarcOPTES*. a, dorsal view of head; b, lateral view of jaws or chelicera. (Original)

cases, mite-free scales have been encountered where the surrounding ones had all been mite infested. It seemed that these few scales were so closely attached to the bark that the mites were deterred from entering. The eggs were evidently deposited by these wandering mites in groups of from one to six per scale; they are small, less than half the diameter of the oyster-shell scale eggs, whitish, and usually to be found in the posterior end of the scale. Scales have been repeatedly found showing no trace of mite work other than a tell tale little group of minute eggs in the caudal extremity.

In Canada, as in France, the mite is able to hibernate in any or all of its stages. In material collected in the winter, I have found eggs, six-

legged forms, and eight-legged adults, though the last have been found in far the greatest abundance.

The species maintains its activity at comparatively low temperatures, and this is, to a considerable extent, responsible for its usefulness, as it enables the destruction of scale eggs to be continued until the days as well as the nights become frosty. At Fredericton, N.B., the mites were found to be active on warm days even in December, although most of the pre-winter feeding was accomplished, as Shimer found in Ohio, during August and September. Mites brought into the laboratory in January warmed up sufficiently to walk in a very few minutes, so that the species can evidently make use of any warm days during late autumn and early spring.

The importance of *Hemisarcoptes* as a factor in the control of the oyster-shell scale has been recognized particularly by Shimer, Lignières, Saunders, Dearness, Jarvis, Ewing, and Webster. The present observations seem to show that the animal is perhaps even more useful than has been supposed. Two districts have come to notice in which the scale is evidently on the verge of total destruction on account of the immense numbers of these mites. One of these is Moncton, N.B.; at this place the infestation of the scale was fairly heavy in 1916, but the mites were so abundant that by October 16 they had killed nearly all the eggs; an estimate of the ten collections itemized on the chart (page 238) indicated an egg destruction of over ninety per cent, and mites were found in all but 2.7 per cent of the 1400 sample scales examined; with the mites increasing and the food supply decreasing, it seemed certain that by hatching time in 1917 there would be exceedingly few scale eggs left, and a field examination made in October 1917, showed this promise of enormous destruction to have been amply fulfilled. Similar conditions were found in a group of

places in Huntingdon county, Quebec, including Havelock, Hemmingford, Covey Hill, and Barrington; the conditions at Havelock are typical for the four places: in this case, of the hundred new scales turned over, nine still had a full complement of healthy eggs, and of ninety-one which were infested with *Hemisarcoptes* only four contained a few healthy eggs.

In these two districts the oyster-shell scale has been plentiful, and the mites have had an abundant food supply. With these favourable conditions, the mites have evidently increased, until the scale has been almost completely destroyed. The conditions at many other places, however, were found to be quite different. In the Arboretum of the Central Experimental Farm at Ottawa, Ont., the scale is abundant, and the mite is rather less so than at Moncton and the group of places in Huntingdon County, Quebec, (cf. table p. 238). On Mount Royal, Montreal, Quebec, the scale is also abundant, and the mite still less abundant than at Ottawa. At the end of this series comes Chipman, N.B., with the scale exceedingly scarce and difficult to find, and with apparently no mites whatever.

Such a series of conditions seems capable of interpretation by supposing that when the scale is thick the optimum conditions for the mite prevail, and that the mite then increases until finally, as at Moncton, N.B., it practically exhausts its food supply. The conditions in the Ottawa Arboretum and at Montreal would be transition stages, in which the mite is gradually increasing in proportion to its host. Chipman has probably been all but freed of scale in this way, as Mr. A. B. Baird reports that it was abundant there only a few years ago, and that the elimination has come about without spraying.

Such an interpretation would explain, also, the almost complete absence of the scale at Campbellton,

ANALYSIS OF OYSTER-SHELL SCALE EGGS, LAID IN 1916, EXAMINED FOR *Hemisarcoptes*.

Locality	Date collected	By whom collected	Trees collected from	Scales examined	Trees with <i>Hemisarcoptes</i>	Scales with <i>Hemisarcoptes</i>	Host eggs destroyed
Moncton N.B.	Oct. & Nov	W. N. Keenan .	10	1400	10	1362	90%-95%
Chatham N.B.	Nov.	G. P. Walker .	3	300	0	0	0
Woodstock N.B.	Mar.	G. P. Walker .	1	100	1	37	35%
Kingsclear N.B.	Mar.	G. P. Walker .	2	200	2	129	60%
Fredericton N.B.	Oct. & Nov	J. D. Tothill .	21	1600	17	483	15%-20%
Chipman N.B.	Nov.	A. B. Baird .	5	250	0	0	0
Nerepis N.B.	Nov.	G. P. Walker .	3	100	1	21	5%
St. Stephen N.B.	Nov.	G. P. Walker .	4	250	1	53	5%
Truro N.S.	Mar.	W. H. Brittain .	5	24	1	6	1%
Halifax N.S.	Mar.	F. C. Gilliatt .	5*	36	0	0	0
Kentville N.S.	Mar.	F. C. Gilliatt .	5†	245	0	0	0
Middleton N.S.	Mar.	F. C. Gilliatt .	5	435	4	173	35%
Annapolis N.S.	Feb.	F. C. Gilliatt .	5†	230	4	80	25%
Meteghan N.S.	Mar.	F. C. Gilliatt .	5	475	5	250	55%
Weymouth N.S.	Mar.	F. C. Gilliatt .	5	425	5	241	50%
Yarmouth N.S.	Mar.	F. C. Gilliatt .	5	500	5	319	55%
Montague P.E.I.	Dec.	M. H. Coughlan .	5	100	1	20	15%
O'Leary P.E.I.	Dec.	M. H. Coughlan .	6	32	1	5	2%
Stanstead P.Q.	Nov.	C. E. Petch .	13	1300	3	132	3%
Huntingdon P.Q.	Nov.	L. S. McLaine .	5	500	5	466	90%-95%
Mount Royal P.Q.	Nov.	A. B. Baird .	10	1000	7	150	10%
Ottawa 1 Ont.	Nov.	A. B. Baird .	5	500	2	8	5%
Ottawa 2 Ont.	Nov.	A. B. Baird .	4	400	4	326	50%
Guelph Ont.	Nov.	A. B. Baird .	10	1000	4	27	1%
Kaslo B.C.	Feb.	J. W. Cockle .	1	46	0	0	0
Grand Forks B.C.	Dec.	E. C. Hunt .	4	650	0	0	0
Vernon B.C.	Mar.	M. H. Ruhmann .	4	500	0	0	0
Lillooet B.C.	Dec.	A. W. A. Phair .	2	100	0	0	0
Agassiz B.C.	Dec.	R. C. Treherne .	5	500	0	0	0
Harrison B.C.	Feb.	T. Wilson .	1	400	0	0	0
N. Nicoamen B.C.	Jan.	T. Wilson .	2	515	0	0	0
N. Vancouver B.C.	Dec.	T. Wilson .	2	355	0	0	0
Kuper Island B.C.	Mar.	T. Wilson .	1	200	0	0	0
Indian Reserve B.C.	Mar.	T. Wilson .	1	300	0	0	0
Victoria B.C.	Jan.	E. W. White .	4	1700	0	0	0
Alberni B.C.	Feb.	T. Wilson .	2	500	0	0	0
Duncan B.C.	Mar.	T. Wilson .	1	110	0	0	0
Ithaca N.Y.	April	R. Matheson .	4	550	0	0	0
			181	17839	83	4288	

* Very lightly infested.

† Sprayed trees.

This table shows the importance of the mite *Hemisarcoptes* as a controlling factor of the oyster-shell scale in places where the insect is abundant. It also indicates that the mite has not apparently yet found its way into British Columbia.

N.B., and along the St. John River in Madawaska and Victoria counties, N.B., where its food plants are somewhat abundant and where very little spraying has been done. It would also explain the present scarcity of the scale on some derelict apple trees close to this laboratory that four years ago were heavily infested. The curious eliminations of the oyster-

shell scales noted by Professor L. Caesar may have been due to an attack by *Hemisarcoptes*. Mr. Caesar says, "I have on several occasions seen trees that were badly infested throw off the scales in some inexplicable manner, and take, as it were, a new lease of life."

It at least seems certain that when the scale is abundant this mite is

the most important single factor operating toward control in eastern Canada. In places where the host is less abundant, the mite becomes proportionately less efficient.

In this account I have spoken of *Hemisarcophytes* only as a predator on the eggs of the oyster-shell scale. Lignières has shown, in France, and Mr. A. B. Baird, in New Brunswick, however, that in the summer time the mite busies itself by feeding upon the growing and even full grown scales.

In conclusion, I wish to thank the

many kind friends whose names appear on the analysis table, for assistance in gathering the material upon which this study is largely based; and also to point out that the apparent absence of *Hemisarcophytes* in British Columbia (where the Entomological Branch has already established experimental colonies) suggests that there may be other odd corners of the earth where the oyster-shell scale now flourishes and to which the mite has not yet found its way.

MAKING BORDEAUX MIXTURE

BY G. E. SAUNDERS, DOMINION ENTOMOLOGICAL LABORATORY, ANNAPOLIS ROYAL, N.S.

THE old established method of making Bordeaux mixture after the 4-4-40 formula, by slaking the four pounds of fresh stone lime and dissolving it in 20 gallons of water, and dissolving another 4 pounds of copper sulphate in another 20 gallons and pouring the two together into the spray barrel, either by alternate buckets or by running the streams from the two buckets together as they enter the barrel, usually resulted in a very excellent mixture, but had the disadvantage of being a little slow.

As hand syringes changed to barrel pumps, and they, in turn, to power pumps, and the power pumps developed into outfits capable of keeping up a pressure of from 200 to 400 pounds and throwing from 5 to 20 gallons of spray per minute, the importance of methods of mixing spraying materials quickly increased. Systems of overhead tanks and stock solutions of the two ingredients have been widely used, and have helped in cutting down the time taken in preparing Bordeaux mixture. At various times during the past 20 years powdered bluestone has been placed on the market and subsequently withdrawn, as in use it was dissolved in water before

being put into the spraying tank, and represented only a slight saving in time and no saving in trouble, so did not appear to justify the small additional cost. In the same way, hydrated or prepared lime has been frequently used, but always dissolved in water before being put into the tank. In addition to costing more, than the stone lime it was found that hydrated lime could not be used in conjunction with "arsenoid" or sodium arsenate in the manner in which that poison was used in Bordeaux in many potato sections.

In the course of our investigations on insecticides, we carried on during 1916 and 1917 many experiments in the making of Bordeaux at the Dominion Entomological Laboratory, Annapolis Royal, N.S., with a view to shortening and simplifying the methods of mixing, as it was felt that the trouble and time spent in mixing had been an important factor in eliminating this valuable spraying material from the spray calendar. It was found by using bluestone, powdered finely enough to pass a screen of 20 meshes to the inch, and hydrated lime, that the agitator of an ordinary power spray pump may be made to do the work of dissolving the bluestone and slaking the lime,

and the system of overhead tanks in mixing. The method is as follows: weigh out the bluestone and dump it into the empty tank, start the engine and fill the tank; this will take from five to fifteen minutes, giving a good safety margin, as the bluestone will dissolve in one minute; when the tank is full, with the agitator still running, add the proper quantity of hydrated or prepared lime, and in another minute the Bordeaux is ready to apply. This method does not make the most perfect Bordeaux possible, but it will make a Bordeaux that is better than the average made from materials usually obtained, and has the advantage of saving time and trouble at a season of the year when time is at a premium.

In using powdered copper sulphate one is sure of the amount going into the tank by the scales. In using stock solutions, a gallon from the top does not contain as much bluestone as a gallon from the bottom, so unless one is careful to stir before dipping out variation in the amount going into each tank is apt to occur. The hydrated lime, as we have indicated, is not so active as freshly burned stone lime but it is better than the average stone lime. The

reason for this is that hydrated lime does not carbonate or air slake so rapidly as stone lime, and may be kept for six months in a cotton sack and still will make a good Bordeaux; this is not possible with stone lime.

In using hydrated lime, one should always use an excess quantity over the bluestone, although in actual tests 2 pounds of hydrated lime neutralized 4 pounds of bluestone. In this connection it may be said that the Thomson-Buchanan Bordeaux made up of 2 lbs. of bluestone, 10 lbs. lime to 40 gallons of water, is going to be very widely used on apple trees in 1918 in the localities in which it has been tested. It gives less russetting than the old 4-4-40 formula, and may be used four times on apple foliage with no Bordeaux bronzing of the leaf.

The method of making Bordeaux described was used in the orchard of S. B. Hatheway, of Fredericton, N.B., in 1917, with complete success, and it was found that it was at least no more trouble than drawing lime sulphur and pouring it into the tank. The method can, of course, only be used in power outfits equipped with a mechanical agitator.

THE SEED BRANCH

SEED TESTS MADE IN JANUARY

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

DURING January, 1809 samples were received for test at the Ottawa Seed Laboratory. Of these, 373 were from farmers, 1,111 from seed merchants, and 325 from institutions. The total number received is about 500 less than during the same month a year ago. With most kinds of seed there has been an increase, but this is more than offset by the decline in the number of red clover samples, which was 287

in January, 1918, compared with 893 a year ago. This is a good indication of the scarcity of this kind of seed. Fewer samples of timothy and alfalfa seed were received in January, 1918, than during the same month the year before, but there was an increase in the number of alsike samples. The following indicates the proportion of the samples tested coming within the various grades:—

Timothy, total,	277;	No. 1, 39;	No. 2, 120;	No. 3, 82;	Rejected, 36.
Red Clover	287	" 88	" 82	" 77	" 40
Alsike	272	" 63	" 105	" 45	" 59
Alfalfa	29	" 7	" 15	" 5	" 2

The proportion of timothy samples tested that graded No. 1 was 14%, compared with 17% a year ago. With red clover the proportion of No. 1 this January was 30%, compared with 25% in 1917. The percentage of alsike seed grading No. 1 was 23, an increase of 5 over last year.

Of the total number of samples

received during January, 875 were for germination test. During the month, germination test reports were issued on 1,234 samples. Quite a large proportion of the oat samples from Western Canada showed evidence of frost injury, and were low in vitality. The corn samples so far received indicate poor average germination.

THE HEALTH OF ANIMALS BRANCH

SWINE IMPORTATION REGULATIONS

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, has been pleased to order that the regulations established under "The Animal Contagious Diseases Act," of the 30th November, 1909, and amendments thereto, shall be amended by rescinding Section 42, and substituting in lieu thereof the following section:—

Swine—

Sec. 42 (a) All swine must be accompanied by a certificate signed by a veterinarian of the United States Bureau of Animal Industry, stating that neither swine plague or hog cholera has existed within a radius of five miles of the premises in which they have been kept for a period of six months immediately preceding date of shipment, but such swine shall nevertheless be inspected, and shall be subject to a quarantine of thirty days before being allowed to come in contact with Canadian animals.

Non-immunized Hogs.—

(b) The importer will be required to produce an affidavit to the effect that the swine he proposes to import have not been immunized to hog cholera by the simultaneous injection of hog cholera virus and serum.

Double Treated Hogs—

(c) Pure bred hogs immunized by the simultaneous method of injecting serum and virus will be permitted to enter Canada when accompanied by the affidavit of the breeder or last owner that they were immunized not less than thirty days prior to importation, and have been immersed in a satisfactory disinfectant solution previous to shipment. Thirty days quarantine is required for these and all other hogs.

NOTE.—Sub-section (c), the third and last sub-section here given, is an addition to section 42 of "The Animal Contagious Diseases Act," as it originally stood, and constitutes the only change to the section.

THE DAIRY AND COLD STORAGE BRANCH

THE CHEESE COMMISSION

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE appointment of a Cheese Commission, and the export of the Canadian surplus through that channel in 1917, has probably been more widely discussed than any other aspect of the dairy situation as affected by the war.

The Commission was necessary to handle the cheese under the growing difficulties of finance and transportation. Without some arrangement of this kind it is difficult to say what would have happened, because the export of cheese could not have been continued on the old lines at any price.

The Commission had no power to take the cheese unless producers were willing to sell. There has not been, nor is there any regulation, or other legal obstacle, as far as the Commission is concerned, to prevent a Canadian exporter, or producer, from selling his cheese at a higher price than the Commission is paying, if he can get it.

NEW ZEALAND'S FIGURE

As a matter of comparison, it is interesting to know that the British Board of Trade purchased the entire output of New Zealand cheese for the season of 1916-17 at 19c., f.o.b. steamer, New Zealand, and were not at first inclined to pay more for the Canadian surplus of 1917. In view of the difference in the market value of Canadian and New Zealand cheese, and the further fact that the value of all food products has risen during the interval, it did not seem reasonable the Canadian cheese should be sold at the same price as that paid for New Zealand cheese some months previously, and it was so pointed out to

the proper authorities. The British authorities have just concluded another deal with the New Zealand cheese manufacturers, to take their surplus for the season of 1917-18 at a price which will net them between 19c. and 19½c. per pound, f.o.b. steamer. Canadian cheese has been sold between these two New Zealand seasons at 21¾c.

WAREHOUSING AT MONTREAL

When the Commission got to work and adopted rules for the acceptance of cheese, strong objection was taken by exporters in Western Ontario to the rule which required all cheese to be warehoused at Montreal. It was felt at first that there was a discrimination in favour of the Montreal exporters. Now that the situation with regard to shipping is better understood, I feel assured that the dealers are prepared to concede that the plan adopted was the only feasible one. It would have been impossible for shippers in Western Ontario to have carried on business along the accustomed lines, as through billing was out of the question; all regular sailings were cancelled, and it was impossible to book space ahead. The Commission was often called on to load large quantities of cheese at 24 hours' notice. Space, after being allotted, was frequently cancelled at the last minute. Nothing could be done on the old basis.

THE SAVING EFFECTED

A great saving has been effected by delivering the cheese to the British Government, f.o.b. steamer, Mont-

real. In normal times an exporter, when he delivers cheese to a steamer, gets his receipted bill-of-lading and other documents. These he takes to his banker to whom he sells them at a price, the banker undertaking to collect the money from the consignee of the cheese in the United Kingdom. Of course the banker charges for doing this, especially as he is generally out of his money for sixty days. The charge varies from day to day according to circumstances, and this is known as the rate of exchange. At the present time the rate of exchange is very low, or in other words, if it is desired to sell bills of exchange a very high rate would be charged by the banker for collecting the money in England. The difference in these charges between pre-war days and the present time would amount to \$1,461,000 on the total cheese export of 1917. That would be part of the cost of delivering the cheese to Great Britain, and would have to come out of the cheese. Then again, the British Government, on taking delivery of the cheese at Montreal, assumed the marine insurance and the war risk insurance, which would have amounted to an additional sum of \$2,210,000 on the season's exports. If these two items had been paid by exporters in the usual way, as part of the cost of delivering the cheese, the price would have been reduced accordingly and it would have amounted to about 1 $\frac{3}{4}$ c. per pound on the total exports.

EXTENT OF THE PRODUCER'S BENEFIT

It is doubtful if there is any article exported from Canada other than cheese on which the producer receives such a large percentage of its value f.c.b. steamer, even in normal times. Under the Cheese Commission the producer has received more than usual. There are certain charges, such as freight, cartage, storage, cooperage, etc.,

which may be called fixed charges, to be paid no matter how the cheese are handled. The prices paid in this country last season were too high on the average to leave any profit to the dealer, so the producer got the whole value, less the fixed charges. The expenses of the Cheese Commission have amounted to only eight-tenths of a cent per box. The members of the Cheese Commission have given their services without any remuneration whatever. There are some things about the situation as it existed last spring that cannot be made public, but I am convinced that the handling of the cheese by the Commission has put millions of dollars into the pockets of the Canadian producers.

TOTAL EXPORTS, SEASON 1917

Down to December 31 the Cheese Commission had accepted a total of 1,860,237 boxes of cheese, weighing 155,662,463 pounds. Of this quantity 1,087,359 boxes were from Ontario, 755,390 from Quebec and 17,488 from Prince Edward Island. Western Ontario, that is to say the district west of Toronto, supplied 61,538 boxes, but it should be added that this district made relatively heavy shipments before the Commission began operations, and it is said that there are several thousand boxes of Western Ontario make yet to come forward, on which the holders are very kindly carrying the storage and shrinkage charges and thus saving that much to the Commission. It is also to be noted that a large proportion of the cheese which goes into the home trade are from Western Ontario. I have no figures as to the exact quantity so disposed of.

BEFORE THE COMMISSION TOOK HOLD

I have taken the trouble to ascertain the total number of boxes and the weight of the cheese of the 1917 crop, which were exported through the regular channels before the

Cheese Commission began operations, and I find that there were altogether 123,909 boxes, or 10,656,174 pounds thus exported. There are probably 10 to 15 thousand cheese yet to be delivered to the Commission of the crop of 1917, so that the total exportable surplus for the year will be very close to 2,000,000 boxes, or 172,620,000 pounds, with a value of \$37,544,850, an increase of over \$4,000,000 as compared with 1916. These figures cover only the cheese shipped to the United Kingdom. There have been small shipments as usual, probably amounting to 1,000,000 pounds, to other countries. The unrevised figures of trade and navigation published by the Customs Department show that the exports to the United Kingdom for the 12 months ending March 31, 1917, which represents approximately the crop of 1916, amounted to 179,000,000 pounds.

It would appear, therefore, as though our exports of cheese for 1917 will show a slight decrease as compared with 1916. If it is true, however, as I am inclined to think it is, that the home consumption has increased, it is probable that the total production of cheese in Canada for 1917 was just about the same as it was in the previous year. When we consider the large quantities of milk which have been diverted from cheese factories into other channels, the showing is a very good one indeed. Our exports to the United Kingdom for the season of 1914 were only 135,000,000 pounds, so that we have increased our exports since the beginning of the war by 35 to 40 million pounds; or in other words, the value of the cheese output of 1917 was eight million dollars greater than it would have been if the production had been the same as in 1914.

THE LIVE STOCK BRANCH

REGULATIONS TO GOVERN STOCK YARDS

A conference of representative live stock officials and stock yards operators was held in Ottawa on February 11th to draft regulations for the putting into force of the Live Stock and Live Stock Products Act of 1917, reviewed in THE AGRICULTURAL GAZETTE of October, in so far as it relates to the operation of stock yards. The meeting was called by the Honourable the Minister of Agriculture and presided over by the Live Stock Commissioner. There were present representatives of the provincial Departments of Agriculture, of Live

Stock Associations, the Eastern and Western Canada Live Stock Unions, stock yards managements, Live Stock Exchanges and federal officials. Suggested regulations prepared to conform with the Act were gone over with full deliberation and so amended where necessary as to meet the requirements of practical operation.

During the course of the meeting it was announced that Mr. D. M. Johnson would represent the Department on behalf of the Live Stock Commissioner in the administration of the Act in so far as it affects Stock Yards and Live Stock Exchanges.

PART II

Provincial Departments of Agriculture

SEED SUPPLY FOR THE CURRENT YEAR

PRINCE EDWARD ISLAND

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

DURING late years the production of high class grain, especially oats and barley, has been substantially encouraged by the various forms of instruction received through such mediums as agricultural meetings, seed centres, and especially seed fairs. The demand for high class seed has so grown with the encouragement that has been directed towards the production work, that even during the present year when many other parts of the country are feeling a stringent need for greater supplies of seed grain, the province of Prince Edward Island will be able to supply its own needs and have a surplus for export; needless to say, the export for this year will be smaller than in previous

years, owing to one or two sections of the province being affected by rust on last season's oat crop. However, it is felt that the usual agencies of distribution will be sufficient for the demand, namely, the seed centres established by, and operated under, the instruction of the Canadian Seed Growers' Association and the Farmers' Institutes.

No need has been found for any special provision in financing associations to handle the seeds, as it is purely a co-operative undertaking on the part of the agricultural associations, the buying and distribution being carried out by the secretary of each organization and the financing proportionate among those interested.

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THE Department of Agriculture for Nova Scotia has taken steps to insure a supply of seed to the farmers of the province for the coming spring. The Department has also taken a step in the direction of making available a quantity of fertilizer.

1. We are guaranteeing certain representative seed firms against loss on the unsold surplus of cars of

seed wheat which they purchase on our advice, and which they in turn agree to sell to farmers at not more than a moderate profit. Through this arrangement we think that we have insured an ample supply of imported seed wheat to supplement the local supplies available.

2. The same policy is being used in connection with seed oats, but it has not yet been brought to quite

as successful a conclusion, mainly for the reason that difficulty is being experienced in getting satisfactory quotations on supplies of seed oats.

3. To encourage the growing of shell beans in those parts of Nova Scotia where the crop has been precarious the Department has purchased and located several hundred bushels of hardy strains of early maturing seed beans, which are now being offered to the trade or to farmers at cost. This is being used as the centre of a campaign to get farmers and gardeners in each part of Nova Scotia to grow enough beans for their own use.

4. The turnip is one of the most important crops of Nova Scotia, and turnip seed is scarce and high. We have fortunately arranged with several firms that had not planned to do so to stock up with extra supplies, and we have one or two other reserve sources of seed supply to fall back upon should scarcity develop by seeding time.

The potato seed situation is not a

serious one in Nova Scotia, as there is an ample provincial supply, the only occasion for shortage being in some localities in Western Nova Scotia where very large sales were made for the West Indies trade; but no difficulty is anticipated in securing seed for these sections from other parts of Nova Scotia.

In conclusion, the Department is issuing literature and holding a series of educational meetings, the aim of which is to encourage farmers to buy their oats and wheat immediately. If this policy proves successful it is hoped that a knowledge of the final seed requirements will be secured some time in advance of seeding, so that supplemental measures may be taken if necessary.

I may add that the Nova Scotia Government has purchased a reserve supply of fertilizer which will not be put on the market unless the local supply gives out. Fertilizer is fully as important as seed in Maritime Canada.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

WHEAT, oats and buckwheat are the three principal cereals grown in the province. The crops of 1917 were below normal in yield and quality, a very large percentage being unfit for seed.

Normally large quantities of oats and some wheat are annually imported, but this year the requirements were so much larger that early action was taken. Seed had to be supplied also for the increased acreage obtained through the campaign for greater wheat production. Every farmer is requested and urged to grow some wheat. The objective is five times the average in the province.

The organization necessary to reach every farmer, if formed for this express purpose, would need to

be large and is considered not practical. Instead the county councils were appealed to because there were, according to law, two councillors from every parish. A conference composed of representatives from the various councils was held at Fredericton, and those in attendance agreed to place the matter before their respective councils at the January session.

A wheat bulletin was issued and distributed by the schools, and enquiry cards were sent out through the same channels, thus bringing the question home to every farmer. Circulars were forwarded to every agricultural society, newspaper articles were frequently sent out, and every clergyman was requested to make particular reference to, and to

place emphasis upon, the necessity for the greater production of wheat for 1918. The result has brought a large enquiry for seed and for information about crops not generally grown.

A representative from the Department of Agriculture attended every county council meeting during January and placed the following proposition before them:

(1) That the councillors become responsible for the canvass of their respective parishes, urging the production of cereals and to take orders for seed.

(2) That the council appoint a committee to co-operate with the Department of Agriculture and work out the details as required in every county.

(3) That the Department of Agriculture purchase the quantities of seed recommended by the various committees; finance the purchases, store, if necessary, and deliver to the county committees in late winter or early spring in car-lots at points recommended by them.

(4) That the councils reimburse the Government by meeting sight drafts where

arrangements could be made, or, if necessary, thirty days be allowed, thus giving the councils an opportunity to dispose of much of the grain for cash.

(5) The method of distribution and collection to be as the councils considered in the best interest of production in their respective municipalities.

Two-thirds of the councils accepted the proposition as presented and the balance arranged for a campaign urging production, but requested the Department to distribute the seed. Thus about 400 men were morally bound, whereas under a Departmental staff the numbers would be very small.

The municipal councils were empowered to raise short term loans for such enterprises by an Act passed in the session of 1917.

Where farmers require credit to purchase seed the necessary arrangements were in several cases left with the parishes, whereas others decided that the municipality should advance the credit.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

IN view of the great need for the maximum production of food-stuffs this year, the Ontario Department of Agriculture has been giving special consideration to the subject of the seed supply. In the first place, it may be noted that the province is served by several well established and enterprising seed firms. Any action taken by the Department, therefore, is supplementary to the usual channels of trade designed to meet any additional demand there may be for certain kinds of seed for crops which may be emphasized in the general work of the Department, or to extend the use of varieties which the experiments of the Department have shown to be superior.

There is, of course, a considerable exchange among farmers in their purchase of seed. To assist farmers

who have seed for sale, or those who desire to purchase, the District Representative offices located in the counties are used as a sort of clearing house. Farmers are requested to write advising of their needs, and the District Representative does his best to secure the grain, or make a sale, as the case may be. Last year this plan was adopted, thousands of bushels changed hands in this way, and there is no doubt it will again be taken advantage of to a large extent.

Then, too, the field crop competitions conducted through the agricultural societies usually result in the production of considerable quantities of grain suitable for seed, both because of the varieties included and their freedom from weeds. The names of prize-winners in these competitions are published by the

Department, and these reports are given a wide circulation, so that other farmers may have the addresses of men who are likely to have seed of the varieties mentioned available.

SHORTAGE OF CORN AND OTHER SEED

One of the most critical needs at the present time is an adequate supply of seed corn. Large quantities are imported from across the line each year, and this year the importations are likely to be larger owing to the unfortunate weather conditions which decreased the Ontario-grown crop last year. Ontario seed dealers have been fortunate in being able to place contracts for considerable quantities across the line, but, owing to the transportation congestion, it is very difficult to secure movement. The Department has had the matter up with the Food Controller, who, in turn, is negotiating with Washington, but the subject will no doubt continue to call for close attention until the supply is definitely secured.

Similarly, there are difficulties in regard to seed for crops such as peas grown for canning purposes. The American Food Administration has declined licenses for certain varieties which they claim are needed in their own country, and the question of refusing permission to ship varieties from Ontario has also been up for consideration.

In the matter of spring wheat, peas, and beans particularly, the Department is co-operating with the Federal Seed Commissioner, who has made arrangements for a reserve supply which will be available to farmers of this province in carload lots.

AS TO SEED POTATOES

Considerable attention has also

been given to the matter of an adequate supply of seed potatoes. This has been taken up from the standpoint of the permanent improvement of the crop rather than from the standpoint of immediate increased production. Enquiries have proven that Northern grown seed gives the best results, but, unfortunately, this year only a small quantity of potatoes suitable for seed grown in Northern Ontario can be secured. These are, therefore, being supplemented by seed secured from New Brunswick that is certified as being reasonably free from disease and true to type. The Department is encouraging the standardization of two types of potatoes, being the Irish Cobbler as an early potato, and the Green Mountain as a late potato. The Department is undertaking to place farmers who are able to purchase in carload lots in touch with sellers who have seed available, and who can be relied upon as to quality, the inspection being done by the officials of the Federal Department of Agriculture. Arrangements are being made to provide a larger quantity of Northern grown seed for the 1919 crop.

The Department is also co-operating with the Seed Commissioner in endeavouring to provide a supply of home-grown root seeds.

Last year an arrangement was made with the banks, by which a loan up to \$200 might be secured for the purchase of seed. This arrangement expired on July 1st last, and has not since been renewed. It undoubtedly assisted a considerable number to secure seed and produce foodstuffs who would not otherwise have been able to do so. It is possible that it may be renewed this year.

MANITOBA

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY,
PROVINCIAL AGRICULTURAL COLLEGE

THERE will be a serious shortage of good seed oats and barley in Manitoba this spring. In the south-western part of the province, the past season was so dry that very poor crops were obtained, with the result that many of the farmers will have to purchase feed as well as seed. Ordinarily this would be no great hardship, but this year, however, a new difficulty has arisen.

The north-western portion of the province produced an abundance of oats, and a fair amount of barley was raised in the east and central, while many of the oats in the north have been frosted, and will germinate very poorly. Out of a number of samples tested by the Field Husbandry Department, Manitoba Agricultural College, the following are the results:

Viability	Percentage of samples tested.
91% or over.....	14%
81 to 90%.....	14.1%
61 to 80%.....	28.3%
60% or below.....	43.6%

The above table emphasizes two things: first, the necessity of testing all seed oats, and, second, where the test is low, of securing good seed early, because good oats will be scarce. In addition to the limited supply of good seed, is the fact that mill feeds, screenings, etc., are high in price and difficult to secure, compelling many farmers to feed grain that would otherwise make good seed. If a farmer finds that his grain is low in vitality, there are three avenues through which he may secure seed. First—purchase from the neighbours, second—purchase from the farmers in other parts of the province, third—purchase from the seed houses, grain commission merchants, or the rural municipalities.

PURCHASING SEED FROM THE NEIGHBOURS

If good seed of the approved varieties can be secured in the district, this will be the safest and cheapest source. It will be the safest course, as there will be no danger of the introduction of weed seeds new to the district. This point cannot be over-emphasized, because, when there is an inter-district or inter-provincial change of seed, there is always considerable loss to the district by the introduction of noxious weeds. Some years ago, the seed crop was a failure, in one of the better districts outside of the province. Considerable seed was supplied in Manitoba and other points, with the result that large quantities of quack grass seed was introduced, and it has since been a problem in that district. Purchasing from the neighbours is the cheapest method because there will be no freight or sacks to purchase, and, finally, it is the most satisfactory because the farmer can see the grain before he makes the purchase.

PURCHASE OF GRAIN PRODUCED OUTSIDE OF THE DISTRICT

The purchase of seed outside of the district by the individual farmer may be accomplished in any of the following ways:—First—by the farmer direct from the producer, second—through the seed grain exchange of the Field Husbandry Department, Manitoba Agricultural College.

In the first method the purchaser will get the better results by going into the district and purchasing the grain direct from the farmer, after he has examined it in the bin. If this is not done, there is always more or less danger of disappointment because the seed was not what the purchaser expected.

In the second method, the Field

Husbandry Department secures samples from the growers, and after making an analysis, and testing them for germination, supplies this information with the price, to intending purchasers. Where representative samples are secured, this method works very satisfactorily, and is much cheaper in that there is no expense in connection with the purchase.

PURCHASING FROM GRAIN COMMISSION MERCHANTS

Grain commission firms often handle seed grain as a side line. In the course of their regular business they often come in contact with carloads of grain that would make good seed. This is usually sold to groups of farmers in carload lots. Some concerns, however, bag the grain and sell it in smaller lots. By dealing with the commission man it is often possible to secure good seed at quite reasonable prices, because their purchases are nearly always made on the basis of commercial grain values.

PURCHASING FROM SEED HOUSES

The seed houses are very careful in their selection of the seed, much of it being grown under contract and inspected in the field. This insures the selling of pure strains. Naturally, seed produced and purchased in this manner costs considerably more than market grain, consequently the prices usually asked by the seed houses are much higher, but, when the quality of the seed is considered, it is probably as cheap as that bought in any other form.

If there are only a few farmers in the district requiring seed, any one of the foregoing methods will prove to be the best means of securing seed.

PURCHASING FROM MUNICIPALITIES OR GRAIN GROWERS' ASSOCIATIONS

Where there are a number of people requiring seed, it would be cheaper and more satisfactory to pur-

chase it through the Grain Growers' Association local, or, better still, through the municipality. The Dominion Department of Agriculture, through the Seed Purchasing Branch, purchases on the commercial market, any cars of grain that are suited for seed purposes. These are stored in the terminal elevators, interior terminal elevators, and the Harbour Commission elevators. Seed bought west of Saskatoon and Moose Jaw is stored in the elevators at these points. This is to supply the farmers eastward. Seed bought east of these points is stored in the terminal elevators at the head of the lakes. This is used for distribution through Ontario and part of Quebec. Seed stored in the Harbour Commission elevator at Montreal, is used for distribution through part of Quebec and the Maritime provinces. This grain is graded by the commercial graders into the commercial grades such as No. 1 Northern, No. 2 C.W., etc. It is then inspected by a representative of the Seed Branch, to note if it is true to variety, and contains the limited number of noxious weeds. This seed is sold in carload lots to individuals, Grain Growers' Associations, or municipalities.

In Manitoba, a Seed Grain Act is passed each year that there is need for seed distribution, enabling municipalities to borrow money from the Government at 6%, for the purchase of seed grain only. This enables the rural council, after making a survey of the municipality, by which they can determine the amount of seed required, to borrow the money from the provincial Government, and purchase the seed from the Dominion Purchasing Commission. The seed is then distributed to the farmers from the car. The farmers who are in good circumstances are requested to pay cash. The more needy settlers may get the seed on credit, the amount becoming a charge upon the land. In the case of a tenant, he cannot secure the seed in this way without the consent of the landlord.

The Manitoba Department of Agriculture play a very important part in this distribution. By communication with their crop correspondents, members of the legislature and members of the rural local councils, they obtain the approximate needs for the

province. They then circularize the municipalities, stating when and how the seed can be secured. In this way, practically every farmer who requires seed is assured of sufficient to sow his land.

SASKATCHEWAN

BY W. P. TULLIS, ACTING WEEDS AND SEED COMMISSIONER

THE average per acre crop of wheat for all Saskatchewan was not high in 1917, but a survey of the situation goes to show that but a small percentage of farmers did not reap a fair harvest. The most unfavourable returns came from the south-western district, and here it was that the oat crop principally gave poor yields.

A proper distribution of the seed already in Saskatchewan should be almost sufficient for the proper seeding of our 1918 crop. The Dominion Seed Purchasing Commission is bringing in seed oats from outside points to supply any deficiency that exists. As a whole, there is probably more good seed wheat in the province now than ever before in the history of Saskatchewan, and the farmers in general were never better able financially to obtain their seed and put it into the ground right. There are a number of cases, however, as in years gone by, where farmers have no seed and are unable financially to obtain it.

Where land is situated in organized territory, the municipality may borrow such sums as shall appear to the council to be necessary to supply seed grain to farmers who, owing to failures of crops or other adverse conditions, may be unable to procure the same for the ensuing spring season. A loan of money to the municipality for the above purpose does not limit the borrowing powers of the municipality, and, upon appli-

cation of any municipality, the provincial Government may guarantee the repayment of money borrowed for seed grain advances, if such is deemed necessary. Thus needy ratepayers in organized territory may apply to their local municipal authorities for seed and the council, being on the ground, is in a position to know the exact circumstances of each individual farmer. Seed grain up to, but not exceeding, \$250 in value, and feed up to, but not exceeding, \$75 in value, may be advanced on each quarter section.

According to the Local Improvement Act the provincial Government may provide for the purchase, sale and distribution of seed grain in local improvement areas among such farmers and settlers as apply for the same.

It is possible that in the extreme south-west, the provincial Government will find it necessary to take care of a small number of settlers. It is understood that the Dominion Immigration Branch of the Department of the Interior intends supplying seed grain to homesteaders on unpatented lands, and that the provincial Government will, in all probability, assist farmers in the above mentioned areas who reside on patented lands.

It is not likely that any land property prepared for crop will go unseeded because of a shortage of seed.

ALBERTA

BY JAS. MCCAIG, M.A., EDITOR OF PUBLICATIONS, EDMONTON, ALTA.

THE work of this Department to insure a supply of seed for 1918 is concerned with the following grains: wheat, oats, barley, peas, and flax. The seed fair is used to the fullest extent to increase the supply of reliable seed, and to promote interest in the purchase of good seed. Circulars are issued to the exhibitors and samples are requested. A list of those having desirable seed for sale is then mailed to all inquirers. This year the Department has undertaken work in conjunction with the College of Agriculture, the Schools of Agriculture, and the Demonstration Farms, to promote the systematic production and the increase of good wheat for seed. The exhibitors at the seed fairs will be this year offered special prizes for wheat and oats. In addition to this special prize, winners will be allowed to purchase 5 bushels of registered seed which is furnished at elevator prices. They will also be required to sow this on clean and prepared land, to allow inspection by Departmental and University officials, to have it carefully thrashed, to allow inspection in the bin and to clean it before offering it for sale. The Department will undertake as far as possible to find a market for clean seed. Under these conditions it is expected that the growth of this work will lead to the forming of a provincial association which will make its own regulations subject to the approval of the Department. For the present year the distribution is limited to wheat and oats, and the wheat will go to Calgary and points south, and the oats to the country north of Calgary.

THE SEARCH FOR GOOD SEED

Up to the present the Department has been concerned chiefly with try-

ing to increase the production of good seed in the province. In the case of timothy, a bulletin was issued which was widely distributed and has had a good effect. At the Schools of Agriculture in their experimental plots, tests of alfalfa are being made to find out which kinds are best suited to district conditions, but the seed is not being distributed in commercial quantities.

In the case of field-root seed, nothing has been done in local production. The public have been advised from time to time in circular letters with respect to the necessity of securing seeds.

Potatoes have been a satisfactory crop in the province this year, and seed will likely be plentiful. The Department has been chiefly concerned in helping to dispose of commercial potatoes where the production has been large. The Department has purchased for a large western house a car-load of seed potatoes. The supply of good potatoes seed will probably be more than sufficient for all needs.

THE QUESTION OF FINANCE

With respect to the financing of associations, or individuals requiring credit, nothing has been done this year, but the matter is under consideration. What was done last year was that money to the extent of \$50,000 was made available by arrangement with one of the banks for loans to farmers for the purchase of seed. The notes were made payable on the 1st of January following, and were guaranteed by the Department. Last year \$40,000 of this money was used, and 9,000 bushels of wheat, 34,000 bushels of oats, and 2,700 bushels of barley were distributed.

BRITISH COLUMBIA

BY H. O. ENGLISH, B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

WHILE British Columbia farmers have not, in the past, grown much grain other than oats, the prevailing high prices paid for wheat and the scarcity of hog feed has induced many to prepare for the seeding of increased acreages of wheat, oats, barley, and corn in 1918. There appears to be a strong demand for good seed.

To ensure an optimum distribution of the best seed of all the mixed farming crops grown in the province, the Department compiled and published a seed-growers' directory, containing the names of the provincial seed growers, the kind of seed grown, and the quantity offered for sale by each. This directory brings the prospective buyer of seed into touch with the local grower. Corn, grass, root, and vegetable seeds were also listed.

Since sufficient seed to meet the provincial demand was not available locally, steps were taken to ascertain whether it would be necessary to bring in seed from outside the province. The leading seed merchants were interviewed, and the 1918 seed stocks compared with the 1917. It was found that the supplies of oats, barley, corn, peas, vetches, and root seeds were somewhat limited.

The farmers have been advised of the seed shortage through the farmers institutes, and urged to purchase their seed early. The seed merchants have agreed to notify the Department of the threatened exhaustion of their supply of any one kind of seed. In the meantime, the Department is locating available supplies of seed outside the province, and is prepared to purchase, and deliver, such seed as is required, to the farmers of the province at cost.

Anticipating a scarcity of alfalfa and clover seed, the Department operated a clover and alfalfa huller in the interior during the fall of 1917. Several tons of seed were threshed and disposed of locally.

Provision is made under the Provincial Land Settlement Act for short term loans to farmers to enable them to purchase seed.

In addition to the foregoing, recent action has been taken that should place the seed industry of this province on a better basis. A British Columbia Seed Growers' Association has been formed, and officers elected. While this organization cannot be expected to render much assistance with the distribution of the 1917 seed crop, it should be an important factor in the future.

DUSTING vs. LIQUID SPRAYING

QUEBEC

BY GEORGES MAHEUX, PROVINCIAL ENTOMOLOGIST

BRIEFLY speaking, the position of Quebec as regards experiments is the following: In accordance with an agreement made between the Dominion Entomologist and the Provincial Entomologist, all experimental work on spraying in Quebec is to be carried on under the direction of the former officer. The Dominion Field Officer for the province of Quebec conducts all necessary experiments and the results obtained are communicated to the provincial officers. The latter spreads this information among the farmers and recommends the adoption of the best methods of control, when the efficiency of these methods has been clearly demonstrated.

The reasons for this system are obvious. The unity in direction and conception, the assurance of conducting successfully such work in all parts of Canada, the advantage of being able to employ a relatively large number of experts, are factors indispensable to achieve practical results. And it is considered that

all these elements of success are to be found in Ottawa. Unfortunately, the organization elsewhere is not as perfect as it should be. Provincial officers, unless they have a large and complete staff, are not in a position to participate as much as they should in these experiments, as educational work requires their constant attention and most of their time.

As regards spraying, we think, it is infinitely better to continue with the solutions employed so far, so long as it has not been clearly shown that the dust sprayings are better and to what extent they are superior. That is to say, before recommending the use of dust sprayings, it would be necessary to find exactly the proportion of component elements, most suitable time, details of application, etc.

Our task is quite heavy enough for the present. We have to encourage the farmers to spray more, in order to protect their crops and increase production, and we have no time left for other undertakings.

OKA AGRICULTURAL INSTITUTE

BY REV. FATHER LEOPOLD, PROFESSOR OF HORTICULTURE, OKA AGRICULTURAL INSTITUTE

AS the acreage in orchards at the Oka Agricultural Institute is quite considerable—over 65 acres in all—I decided to purchase the largest dusting machine on the market, the D1 Niagara outfit, weighing a trifle over 300 lb., and to which I attached a 3 h.p. Fairbanks-Morse gasoline Z model, which gave perfect satisfaction. Power is needed to get the best results with a dusting machine. So I

would not advise any machine less than 3 h.p. with a large dusting outfit. The whole outfit was rigged up and strongly bolted on a specially strong platform.

There was no comparison made between the dusting and liquid sprayings, as I believe both are good and serve their purpose. No liquid sprays were, therefore, used on the 65 acres of the apple orchards during the past season. It is, therefore,

a strictly commercial test of the dusting method applied in our orchards and outlined here that I offer in this summary of our work.

Dusting for the control of insects, especially for codling moth, was made over the entire acreage, comprising 3000 trees. This was not the case of the dusting for control of scab, which attacks, here at least, only such varieties of apples as the Fameuse, McIntosh, Russet and sometimes Wealthy and Ben Davis.

In the test for the control of scab, we dusted only 800 trees out of the 3000 in the orchard. So we will

for the first application, when the buds were showing pink, namely, 50% sulphur, and 50% gypsum, as a filler, costing \$1.66 per 100 lb. applied to 800 trees, at the rate of $1\frac{1}{2}$ lb. (an average) per tree. I, therefore, used 1200 lb. of this mixture, costing \$19.92 or 0.0249 per tree. (N.B.—We did not need to mix any arsenate of lead in this application nor in the following, as there were no insects to control.)

The second application was renewed once again before the opening of the flower buds, when the petals of the individual flowers were separ-



AT OKA AGRICULTURAL INSTITUTE, FATHER LEOPOLD AT WORK; NOTE, DUST COMPLETELY HIDES TREE TO THE REAR

divide the cost of material and labour in two sections—A, *The Scab Control* on 800 trees, and B, *The Codling Moth Control* on 2200 trees.

CONTROL OF SCAB AND CODLING MOTH

A.—Material used for control of scab and codling moth on 800 trees: The usual recommendation of materials for the control of these two pests is 90% sulphur (superfine), and 10% lead arsenate, costing \$6.25 for 100 lb. of mixture. As I judged this was too costly, and not necessary, I used instead my own mixture,

ated, but not open, buds showing pink or rosy, making the cost again 0.0249 per tree.

The third application for scab, and first for codling moth, when the petals of the flowers had nearly all fallen, the material used was: 40% sulphur, 10% lead arsenate, and 50% gypsum as a diluent, costing \$3.88 per 100 lb. At $1\frac{1}{2}$ lb. per tree on 800 trees, 1200 lb. costing \$46.56, it made an outlay of 0.0582 per tree.

The fourth application for scab control, and the second for codling moth control, were made with the

same materials as the preceding one and at the same cost: 0.0582 per tree; the application being made two weeks after the preceding one.

Summarizing the expenses for the materials for the four applications on the 800 trees of test A:

Application	Per tree.
1st.....	0.0249
2nd.....	0.0249
3rd.....	0.0582
4th.....	0.0582

Total..... \$0 1662

A little over 16½ cents per tree.

The last dusting on the 2200 trees, after two weeks, was made with the same mixture as the preceding application, costing also 0.0468 per tree. Summarizing the B test:

1st application.....	0.0468
2nd application.....	0.0468

Total..... \$0.0936

or over 9 cents per tree.

COST OF LABOUR

The saving in dusting compared with liquid spraying is mostly in



AT OKA AGRICULTURAL INSTITUTE: WIND DRIVING DUST RIGHT IN THE ROWS;
DUST FLOWS OUT OF PIPE CONTROLLED BY LEFT HAND

CODLING MOTH ONLY

B.—Material used for control of codling moth only: 15% sulphur, 10% arsenate of lead, and 75% gypsum as diluent, costing \$3.12 for 100 lb. With 1½ lb. per tree on 2200 trees, using, therefore, 3,300 lb. brought the total cost to \$102.96 or 0.0468 per tree. This first application for the control of the codling moth, made when most of the petals were fallen, was made with little sulphur in the mixture, as the varieties were not subject to scab. But even the 15% sulphur seemed to have an excellent effect on the foliage of the trees.

the cost of labour, as dusting can be done readily at least six times quicker than spraying thoroughly. But one must not be induced to think that dusting is an easy job and can be done in haphazard ways. No, the work must be done as carefully as with spraying, but in a much quicker fashion. At the Oka Agricultural Institute, where we have some difficulty in getting water, we always lost a considerable lot of time in going from the orchards to the filling point, though the tank had a capacity of 250 gallons of water.

Taking everything into considera-

tion, one can dust trees of a medium size, at the rate of 200 per hour, supposing no time is lost and the horses are kept continually in motion. The cost for one application of 800 trees would, therefore, be, counting two men at 20c. per hour and a team at 25c. per hour, \$2.60, or 0.0325 per tree. For the four applications, this would make: 13 cents per tree. This is an average figure, as trees differ in size in an orchard, some being dusted quicker than others. Our trees are certainly smaller, as a general rule, than most trees in Ontario or in the States.

Adding 2 other cents for contingencies, gasoline, etc., per tree, the total cost per tree averaged 15 cents.

Thus, taking in account the cost of the material on Test A, of 0.1662, and 0.15 cents for labour, this makes an average of 31 cents per tree for the control of apple scab and codling moth on Fameuse and McIntosh trees, on 800 trees.

The cost for the control of codling moth alone on 2200 trees amounted to: \$0.0936 per tree for material, and 0.15 cents for labour, making a total cost per tree of 24 cents in Test B.

Remember that the cost in the latter case, is for two applications only, and, in the first case, Test A, for four applications.

RESULTS

In considering results, one must not forget that if ever we had a wet season, in the literal sense of the word, it was the season in which all spraying was done in the province of Quebec—in 1917. In the whole course of my personal experience, I never had to deal with such a bad season as the last one, and I can certainly say that it would have been absolutely impossible to get out in the orchard and go over the trees with a heavy gasoline spraying outfit, hauling around the orchard 250 gallons of water, and do the work in time as we have done with the dusting outfit. On the other hand,

in a dryer season, the dust clings more to the foliage than in a wet season, thus more fungicide is apt to be present on the foliage to protect it against fungous attacks.

Taking the weather conditions into consideration, we had an average of 85% clean fruit, free from scab or codling moth injury, and I am perfectly safe in saying that this is as good, if not better, than we could have had in such a wet season with liquid sprayings.

One thing noted by everybody who had a chance of seeing the orchards during the past season was the notably clean foliage all over the trees, even on the 2200 that received only a mixture of 15% of sulphur. We expect that next season, after having such good foliage, the crop will be more abundant, as it has been noted by experts that the longer the foliage rests in good condition on a tree, the better the following crop. So good and thorough spraying is always a good investment for the next season's crop.

Prices obtained in the season of 1917 for boxed apples certainly are a fair compensation for the trouble and expenses incurred to keep the fruit clean.

DUST MIXTURES FOR ORCHARD WORK

Finely ground sulphur, arsenate of lead in powder form, and a filler were the substances used. The preparation and use of dust mixtures for orchard work is an important item to be solved. Fineness, purity and perfect blending are the essentials in the preparation of efficient dust mixtures. Fineness of material is the most important requirement, as in all other spraying operations, a complete, thorough and uniform covering of both leaf and fruit surfaces is absolutely necessary for satisfactory insect and fungous control. It should require no argument to prove that if the fineness of the material is increased four or five times, the spraying and covering power is in-

creased four or five times, but this is something which can be easily overlooked unless consideration is given the matter. Fineness of material in the case of dust mixtures is also all important from the point of uniform distribution. In dust application, the distribution is affected by the air, and only the finest material can be expected to carry and float through the air into the trees and coat the foliage. Finally, fineness is essential for both distribution and sticking, for coarse material will not float and carry like fine material, and even should coarse material reach the foliage and fruit, it will readily fall off, while a fine dust, as is well known, can hardly be brushed off.

Sulphur.—Of all the materials entering into dust mixtures, the most care should be taken to secure a superfinely ground refined sulphur, because there are so many brands on the market entirely satisfactory for other purposes, but not sufficiently pure, or finely ground, for use in dust mixtures. Insist upon having refined sulphur, guaranteed of such fineness that 95% or more will pass a sieve having 200 meshes to the linear inch, equal to 40,000 holes to the square inch. Excessive fineness means: greater covering power, more complete and uniform distribution, better sticking on the foliage, and better disease and insect control.

Arsenate of lead.—The same care should be used in securing dry arsenate of lead as in purchasing sulphur, as this also means, even application and greater adhesiveness, when mixed with sulphur.

Filler.—I have used two fillers in the orchards in dusting during the past season, gypsum and lime. Experiments carried on so far indicate that the best filler to be used for the purpose of reducing the cost of the mixtures is finely ground gypsum of the grade known to the trade as Terra alba. We used this filler mostly all over in our dustings, with the exception of a block of trees

where we used slacked lime thoroughly pulverized. It is important to get a filler that has about the same specific gravity as the sulphur used.

A FEW SUGGESTIONS

The time of application is very important for both the control of scab and codling moth. As stated already, I believe that one of the great advantages of dusting over the liquid sprayings is the facility of dusting in all sorts of weather, even when the ground is soaked with rain and foliage is dripping. I do not intend to mean that one must wait for rain to begin dusting. No; for we must not forget that if we wish to control or rather prevent scab, we must get the dust or liquid sprays on the foliage before the rain and not after. Fungous spores need moisture to cause germination, so it is necessary that the dust be on the trees to prevent this germination, **BEFORE THE RAIN FALLS.** This does not mean either that the dust must be put on immediately before the rain falls, as it must have an opportunity to set before the rain falls.

When dusting with a power machine in a light or moderate wind, the machine should not be driven too close to the row of trees being dusted, as the dust should have time to spread out in a cloud before passing in and through the foliage.

The best time to dust is early in the morning or later in the afternoon, when there is hardly any wind; but if one has to dust in the wind, then, if the wind is in the east, the application should be made by driving east and west.

It is necessary to cover both sides of every tree to do satisfactory work.

Be careful to cover lower branches as well as the top ones. It will sometimes be necessary to send the outlet pipe backwards in order to cover the low branches, after the outfit has passed the tree. The best manner to use the outlet pipe

to avoid unnecessary loss of dust while covering every point, will soon be learned by the man holding the pipe. It is impossible to give a fixed rule, but, generally speaking, a steady up and down movement is the best all around way. But wind and other factors have to be taken into account and we must adjust ourselves to different circumstances.

Dusting is a tiresome job after all and it is a great strain upon a man if he is giving his whole attention to his work; so it would be wise to change the man if a whole day's work is to be done.

The outlet pipe is regulated by a hand clutch and when the trees are far apart a saving of the material may be made by shutting off the flow of dust, which is done easily. It is rarely necessary to open the flow to its full capacity, generally we have maintained it half full, but always have the engine running

at full speed. The dust must be forced into the leaf hairs, the calyx of the flowers, etc.

It is advisable to have a good pair of goggles. Those provided with a rim of soft wool felt to exclude dust are the best.

Asked if I would recommend dusting, distinctly, no; but, to the owner of a large orchard, I would say that he could invest safely in a large outfit if he has any trouble in getting over his orchard in time in wet weather like the one we had last season.

As to sucking insects, we have not yet found a substitute for the liquid sprays, though some say that in a dusted orchard aphids are less prevalent and do less harm. Personally I have not tried any tobacco dust to control sucking insects.

NOTE.—The dusting was done by Father Leopold himself and his assistant Mr Roméo Cossette, B.S.A., of the staff of the Oka Agricultural Institute.

ONTARIO

BY W. F. KYDD, FRUIT BRANCH, DEPARTMENT OF AGRICULTURE

OUR experience with the duster dates from 1916, when a medium-sized machine was used in a number of our experimental orchards. The season was bad and the results disappointing. The manufacturers claimed that for large trees, such as we were treating, the machine used was not efficient. In 1917 the latest type, large size outfit was purchased, and the dusting carried on in one orchard only, the work being done as carefully as our liquid spraying. Again the season was bad for scab, and the final results, except on Baldwins, were undoubtedly in favour of the liquid lime and sulphur.

Dusting is decidedly ahead of the spraying in saving time and labour,

both important factors at this period in our history. For varieties not subject to scab, dusting will control the biting insects, while under normal weather conditions we might expect to secure better results for scab on all varieties. This can only be found out by continued experiments in coming years. Ontario has experienced unusually bad conditions now for several seasons.

We have examined other orchards where dusting was practised in 1917, and have seen both good and bad results. If improvement can be made in our methods of application, dusting may, and, we hope, will, yet prove a great boon to the commercial orchardist.

THE ONTARIO AGRICULTURAL COLLEGE

BY L. CAESAR, B.A., B.S.A., PROFESSOR OF ENTOMOLOGY

IN 1916, and again in 1917, the writer tested the comparative merits of dusting and spraying as methods of controlling fungous diseases and biting insect pests in apple orchards. The tests both years were conducted in the Niagara district, and all the orchards treated were old, somewhat neglected, and in the preceding year had a very low percentage of clean fruit. As several trees in each orchard were infested

dormant lime-sulphur spray, and after that two thorough dustings—one just before and one just after bloom.

In 1917, two orchards, which we shall call A and B, were treated. Each of these contained a little more than 250 trees, most of them large. One-quarter of the orchard was sprayed thoroughly three times with liquid in the same way as mentioned above in connection with the 1916 orchard. The remaining three-quarters received, first, the dormant or semi-dormant lime-sulphur spray to kill San José Scale, and then had two thorough dustings, one just before and the other just after blooming. Fifty-two trees received a third dusting three weeks later to test the effect on side-worms (codling moth larvæ entering the side of the fruit).

Orchard B in 1917 was treated in exactly the same way as orchard A of the same year, except that roughness of the ground made it more difficult to dust so thoroughly.



DUST SPRAYING AT ONTARIO AGRICULTURAL COLLEGE

with San José Scale, the whole orchard in each case, (with the exception of 48 trees in one that were reserved for a special treatment which it is not necessary to discuss here), was given a thorough spraying with lime-sulphur a little before or just as the buds were bursting.

THE TESTS

In 1916, the test orchard consisted of 165 large trees. Approximately one-third of these received three thorough sprayings, the first with lime-sulphur alone, and the second and third with arsenate of lead and lime-sulphur combined. The remaining two-thirds received, as stated above, the dormant or semi-

RESULTS

The following table shows the result:—

Method	Orchard	% free from scab	% free from worms
Liquid.....	1916.....	99	94
Dust.....	1916.....	97	92
Liquid.....	1917 A.....	99	70
Dust.....	1917 A.....	99	70
Liquid.....	1917 B.....	97	50
Dust.....	1917 B.....	92	60

Note.—In 1917 the crop was small in orchard A, 200 barrels, and in B only 20 barrels. This, and the fact that the codling moth had not been controlled the previous

year, accounts for the small percentage of worm-free fruit. In A, the 52 trees which received an extra application of dust three weeks after the regular codling moth application had 90% of wormless apples; so that such treatment for this pest would have paid well this year.

A study of the above table shows that so far as the Grimsby part of the Niagara district is concerned, dusting, where properly done, was satisfactory both in 1916 and 1917 in apple orchards, and gave almost as good results as the liquid spray both on apple scab and codling moth.

East of Toronto it seems to have been more difficult to obtain as good results from the dust as from the liquid. Reports from New York state and Nova Scotia indicate the same state of affairs: in one locality thorough and intelligent dusting gave excellent results, in another it gave unsatisfactory results and inferior to the liquid treatment.

CONCLUSIONS

Judging from what he has seen and heard, the writer thinks that in normal years dusting should prove satisfactory for apple orchards, but, in abnormal years, when scab is hard to control, it will not give so good results as the liquid method.

Dusting of large trees is about seven times as rapid as the ordinary method of spraying with a gasoline outfit. It is also much cleaner. The outfit is a great deal lighter, and, therefore, can be used in softer

ground and at the proper time. The cost of the two methods for large trees is about the same, but for small trees liquid spray is much cheaper.

Many claim that it is easier to dust well than to spray well. The writer questions this very much. His experience leads to the belief that about 50% of fruit-growers would need a good deal of training to make them efficient dusters. The method looks vastly simpler than it is, and none but a very conscientious and interested man should be allowed to do the work. In many cases it will pay to dust from three or even from four sides instead of two. Three pounds is sufficient for a very large tree, or 600 pounds for an orchard of 200 trees for a single application; in fact this is sufficient for the codling moth application, and about 2½ pounds per large tree would suffice for earlier applications.

In orchards where the trees are free from San José scale, and only lightly infested by Oyster-shell scale, the first application may be given with dust instead of liquid, and in such cases should be applied when the leaves are about the size of a ten-cent piece. In many orchards the sulphur without any poison could be used for this application, thus reducing the cost by over 50%.

The time for the second and third applications should be just before and just after bloom. For any extra applications the spray calendar should be consulted.

"There is some individual who is unknowingly dependent upon you for life. It may be a soldier in the trenches; it may be a little child; it may be a peasant woman, who will not have anything to eat next spring if you do not think of him or her now."—Mrs. Herbert Hoover.

WAR TIME POULTRY RATIONS

In compliance with regulations of the Government of the United States prohibiting the use of more than 10% of any grade of wheat in rations for poultry, the officials in charge of poultry divisions and agricultural colleges in several of the Eastern States have adopted the following rations:—

- Grain: 500 lb. cr. corn. with a variation of 400-600 lb.
100 " Feed, wheat, with no variation,
200 " Barley, with variation of 100-300 lb.
200 " Heavy Oats, with variation of 100-300 lb.

The scratch grain to contain not less than 10% protein, 68% carbohydrates and 4% fat, and not more than 5% fibre.

- Mash: 100 lb. Wheat bran.
100 " Wheat middlings.
100 " Corn meal, corn feed meal or hominy.
100 " Gluten feed.
100 " Ground heavy oats.
100 " Meat scrap.

The mash must contain not less 20% protein, 58% carbohydrates and 5% fat and not more than 7% fibre.

In realization of the importance of conserving cereal grain in Canada without among other things, impairing the production of poultry and eggs, professors and officials of poultry husbandry were invited to send for publication in THE AGRICULTURAL GAZETTE, a criticism of the foregoing rations, with a statement of what each recommended as a standard ration for poultry. The following responses to the invitation have been received:—

QUEBEC

MACDONALD COLLEGE

BY M. A. JULL, B.S.A., MANAGER POULTRY DEPARTMENT

THE complicated features of the present food situation have placed the Canadian poultry industry in a peculiar position, inasmuch as eggs and poultry meat are required in enormous quantities for home consumption as substitutes for the regular meats in the human diet, and, on the other hand, wheat, which has always been considered the staple article of diet in the poultry ration, is also required for exportation for the human population of Allied countries. In other words, wheat has been considered the principle factor in egg production, but wheat is also a staple article of consumption in the human diet. The Allied countries need all the wheat that Canada can export, and the sole question is not whether it is more economical to feed wheat

for the production of eggs and poultry meat to be used as substitutes for red meats, which in turn are demanded for export. Since an adequate supply of wheat seems to be of more immediate need to the Allied countries than beef and bacon, the proper course appears to be to despatch the maximum quantities of wheat at the earliest opportunity, and the principal question then becomes the most economical use of substitutes for wheat in poultry rations.

POULTRY FEEDING CONDITIONS

The Government of the United States has recently issued regulations prohibiting the use of more than ten per cent of any grade of

wheat in rations for poultry feeding. Farmers and poultry men throughout the United States should subscribe to such regulations, because they seem to be in the highest interests of the common cause. The feed situation in the United States, however, is not identical with the feed situation in Canada, simply because corn is the staple poultry food in the United States, and wheat is the staple poultry food in Canada. Therefore, it would seem that regulations affecting the feeding of wheat to poultry in Canada should not necessarily be identical to those recently adopted in the United States. Moreover, the partially paralyzed condition of Canadian transportation facilities does not seem to warrant the obtaining, in the near future, of adequate supplies of the enormous corn crop of the United States. In view of these facts, a criticism of rations suggested by poultry authorities in the United States may not seem quite pertinent. Since a criticism is requested, however, it is made in the light of the applicability of the suggested rations to poultry feeding conditions in Canada, and is of a general nature.

THE DIFFERENCE IN CANADIAN CONDITIONS

From what has been said above it follows that the rations recommended for adoption in the Eastern States, are not adapted to Canadian conditions, for the simple reason that we cannot get the corn, at present at least, and also the prevailing prices of corn (January 21st) does not justify its use in such large quantities as are suggested in the grain ration.

A second criticism of the rations would be that it is almost impractical for Canadian farmers to use definite amounts of any of the grains. This is particularly true of farmers and poultrymen who have to purchase all of their feeding materials. We have to use largely those grains on hand in the greatest quantity at

different times. In view of the relative scarcity of barley, corn, and the prices demanded for oats of good feeding quality, we, in Canada, still have to depend upon feed wheat to carry us along.

A third criticism would be the inadvisability of stipulating the percentages of protein, carbohydrates, fat, and fibre. This seems inadvisable, because, in the first place, farmers and poultrymen have troubles enough in securing any kind of feeding materials at reasonable prices without having to worry over the exact composition of those materials, and, in the second place, very little is known regarding the digestion coefficients of the constituents of any of the grains, much less of compounded rations when fed to poultry.

EACH SECTION HAS ITS OWN PROBLEMS

Instructions regarding the economical feeding of poultry must be of a general nature. Conditions in Quebec are not comparable to those in the West, or to those in British Columbia. Each section of the country has its own poultry feeding problems to solve, though general principles apply everywhere.

The practice at Macdonald College is to feed the scratch ration in the litter morning and evening, thereby inducing the laying hens to take plenty of exercise. The mash ration is fed in self-feeding hoppers in a dry form, and a limited quantity only is fed in V-shaped troughs each day as a wet mash. The dry mash hoppers are kept closed until noon, thus inducing the hens to scratch for the whole grain in the litter instead of eating dry mash in the hoppers. Green food is fed daily about noon. Grit and oyster shell are provided in self-feeding hoppers. Water and buttermilk are fed *ad libitum*.

Scratch Ration.—The scratch ration is composed largely of feed wheat and oats, using barley and corn to a limited extent. The pro-

portions vary, depending upon the market situation.

Mash Ration.—The mash ration is composed of the following mixture:—

Ingredients.	lb.
Ground wheat screenings	132
Wheat bran	66
Crushed oats	66
Beef scraps	66
Cornmeal	33
Middlings	33
Charcoal	4

A large proportion of wheat screenings is used to lessen the cost of the mash, since it replaces largely corn-

meal and middlings. This makes a mash which is quite palatable, and which the birds relish.

Animal Foods.—Ground green bone is fed daily, allowing $\frac{1}{4}$ oz. per bird. Buttermilk is also provided *ad libitum*. These forms of meat foods are fed in addition to the beef scraps in the dry and wet mash rations.

Green Foods.—Mangels are provided daily. Well cured alfalfa hay is also fed occasionally.

Mineral Foods.—Oyster shells and grit are fed *ad libitum*.

Drink Foods.—Water and buttermilk are provided *ad libitum*.

ONTARIO

BY W. R. GRAHAM, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, ONTARIO AGRICULTURAL COLLEGE

BECAUSE of the extraordinary demand for wheat for human consumption the poultry keepers are expected to provide substitutes as far as practicable, in poultry rations. The two most palatable grains for poultry are wheat and corn. In Canada the standard is wheat, in the United States it is corn. If corn can be secured at a competitive price we should make the scratch feed 75 per cent of corn. Hens will lay well on a mixture of corn, barley and oats. Ground feeds are cheaper than whole feeds and when under normal consumption one-third of the ration is ground grain, I believe that we might feed 50 to 60 per cent of ground grain. Oats have been the cheapest feed on the market. We have fed them whole, rolled and sprouted. So long as they remain under \$60 a ton we shall use oats generously. If oats get too high we will feed rolled barley. It should be remembered, however, that a change in the ration cannot be made without a drop in egg production. Changes should, therefore, be made gradually. This applies particularly to the use of elevator

screenings that are being made available to poultry raisers. If chickens can be commenced on screenings there will be no trouble about them, but mature fowls are slow to adapt themselves to new feeds. Screenings should, therefore, be ground for fowls that have not been accustomed to them if we are to get the best results.

At the present time a scratch feed composed of about 20 per cent of feed wheat, 40 per cent of corn or buckwheat, 20 per cent of good oats and 20 per cent of barley, answers very well. Where this is used a certain proportion of meat or milk should be supplied to provide protein. Refuse meat obtained from the butcher shop or elsewhere might be cooked and mixed with bran, shorts, and crushed grain in the proportion of about 25 per cent each of bran and shorts and 50 per cent of mixed chop, moistened and mixed into a crumbly state.

For small flocks, kitchen refuse such as potato peelings and cabbage leaves can be advantageously used by boiling them and mixing with beef scrap. A half pound a day of

this mixture to 20 birds will give good results. After the flock has had a light scratch feed in the morning, it will be profitable in these times to allow them a full meal of the mash at noon.

Those who can grow their own poultry feed this spring should sow

mixed grains, particularly oats, barley and wheat, as the mixture gives a better yield than any of these grains grown alone. Buckwheat also might very well be grown as a special poultry feed and will take the place of corn where the latter is not available.

MANITOBA

BY M. C. HERNER, B.S.A., PROFESSOR OF POULTRY HUSBANDRY, AGRICULTURAL COLLEGE

IN a comparison of laying rations as they are made up and fed, it appears that the kind and class of grains used depend very largely on what is available, and the price of each, in different sections of the country. The standard for the grain part of the ration as adopted by the poultry division of several of the eastern agricultural colleges has been out of the question entirely in Manitoba on account of the extremely high price of corn. It is only since the beginning of 1918 that corn has come down to a moderate price. Aside from the price altogether, the embargo placed on corn during the latter part of 1917 put it out of reach as food for poultry. The license and permit regulations have also prevented free use being made of corn. Lately these have been modified somewhat, and it is now possible for poultry raisers to get this commodity at a moderate price compared to other grains. There is no question about corn standing out as the food for winter eggs in our climate.

The standard for a scratch feed, as adopted by these eastern states poultry departments, is a good one where these feeds are available. It corresponds very closely to the scratch feed this Department has been using when the corn is available. The standard in use here now is:—

lb.	lb.
500 of corn with variation	400-600
200 feed wheat with variation	200-400
150 barley with variation	100-200
300 oats (quite a percentage hulled) with variation	200-400

At the prevailing prices of each of these individual grains, the corn is cheapest, wheat second, oats third and barley last. The price of these in ton lots is to-day (February 5th) corn \$56; wheat, \$65; oats, \$55, and barley, \$64.

CONSTITUENT PARTS OF THE FEED

In regard to the percentage of protein, carbohydrates and fat some of the scratch feeds contain, I am inclined to believe that there is just a little tendency to figure too much on the composition of feeds without sufficiently taking into consideration their palatability and digestibility in poultry feeding. Take for instance the question of feeding Grade A re-cleaned wheat screenings, which from a chemical standpoint are very well balanced. An analysis showed them to contain:—Protein 14.70%; fat, 3.5%; carbohydrates, 69.63%, and fibre, 5.2%. These contained about 55% shrunken and cracked wheat, 15 to 20% tame and wild oats, 15 to 25% wild buckwheat seeds, about 1 per cent barley, and the balance weed seeds and chaff. These fed as a scratch feed to laying hens did not produce eggs. There was a heavy loss in buckwheat seeds that the hens refused to eat. Supplementing these screenings with a dry mash of equal parts of bran, shorts, and oat chop failed to produce the eggs when the cold weather came on. This feed was all right until winter weather set in, when it seemed to lack the heat-producing

qualities required, or, as the composition would indicate, the screenings were too low in fat. The value of these screenings will depend largely on the other feeds fed. The danger in feeding these is in underfeeding. Since most of the wild buckwheat is wasted it is necessary to feed a far greater quantity of screenings so that the hens will get enough to eat. This requires, skill, care, and close observation on the part of the poultry feeder, or else the hens will get thin before he knows it.

FEEDS RECOMMENDED

For farm feeding a scratch feed of equal parts of feed wheat, barley and oats is recommended. The point of using only feed wheat is emphasized. Where this is not available the use of equal parts of barley and oats is recommended, with a frequent change to feeding the barley boiled and mixed in a soft mash. Corn is out of the question on the greater number of farms.

For a dry mash that is fed in a self-feeding hopper, preference is given to oat chop, or crushed oats. This dry mash is rather high-priced, but there is practically no waste, and very good egg production follows its use when combined with the proper line of scratch feed. Equal parts of oat chop, bran and shorts will also make a good dry mash, and cheaper than the crushed oats alone. There is, however, more waste of the finer materials in the bran and shorts, and egg production is hardly so good from this mixture as from the crushed oats alone. Equal parts of crushed oats and chopped screenings make a fairly good dry mash, but there is always a tendency for the hens to waste the finer part of the mash, especially if the screenings contain some ragweed seeds. Chopped screenings alone as a dry mash are not palatable, and the hens do not eat the amount they will of any of the other three mashes. All of these dry mashes have about one-

half to one per cent of granulated charcoal added. A flock of laying hens will eat about one pound of dry mash to every two pounds of scratch feed, providing both are equal in palatability.

For farm conditions we recommend the first named dry mash as the best, with an alternative of equal parts of chopped oats and barley, or equal parts of oat chop, bran and shorts.

EASTERN STANDARD NOT PRACTICABLE

The standard for a dry mash as adopted by the poultry division of the eastern colleges is not practicable for this country. First the entire mixture cannot compare favourably with crushed oats as a dry mash, or the crushed oats, bran and shorts, both in price and in results obtained. Corn meal and gluten feed are out of reach for our farmers. Beef scrap is also almost out of sight in price, and but few farmers can afford to use it. Buttermilk, or milk, in some form or other, will take its place, produce just as good results and be far cheaper.

The ration as outlined should be supplemented with a soft warm mash once a day. Equal parts of chopped oats and barley, bran and shorts, mixed and scalded, and fed once a day at noon, will make a good soft feed, and with green food, such as mangels, or cabbage, will help to balance up the ration and give better results. Chopped screenings and boiled potatoes or turnips mixed and scalded with hot water will also make a good soft mash. The effect of one food on the other may often change the food value of some materials considerably, and this side of the question must be considered along with the composition and palatability of feeds.

In recommending rations we keep in mind the need of letting every pound of good wheat go for milling purposes, even though it may be just

as cheap as any other grains. The farmers generally are ready to use the substitutes, but the small poultry raisers who have to buy all their feed

are not quite so ready to feed the coarser grains which cost them almost the same price as No. 1 or No. 2 Northern.

BRITISH COLUMBIA

BY J. R. TERRY, CHIEF POULTRY INSTRUCTOR

I HAVE carefully studied the war-time poultry rations recommended by a number of United States agricultural colleges (see p. 262 of this issue of THE AGRICULTURAL GAZETTE). Personally, I have not much fault to find with the grain ration, with the exception of the corn at present prices. I would leave this out entirely.

Regarding the mash, I would also leave out the corn-meal at present

prices, and in its place we are recommending the feeding of half-rice meal and half-barley meal. In this country we are unable to get the gluten feed, so would have to leave that out. Until recently, we have been advising the reduction of meat-scrap by half and substituting cocoanut meal in its place. Where this is impossible, we are recommending the feeding of fish scraps.

ALLOTMENT OF AGRICULTURAL EDUCATION AND RESEARCH

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN Nova Scotia the heads of the various divisions of the Department of Agriculture, are also the heads of the corresponding divisions of the college. This plan might not work out in the larger provinces, but in a comparatively small province, where the economization of public funds is an important matter, I consider the Nova Scotia arrangement a very satisfactory one.

Agricultural education in the schools of the province, including the carrying on of such organizations as school fairs, school gardens, etc., is all under the direction of the Director of Rural Education, who is an officer of the Department of Education. This officer frequently secures the services of, and always has the co-operation of the officers of the Department of Agriculture.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

AS we have no agricultural college in New Brunswick all agricultural extension or educational work is carried on by the Department of Agriculture. By an

agreement with the Department of Education, this Department also supervises the work of elementary agricultural education.

QUEBEC

BY J. ANTONIO GRENIER, DEPUTY MINISTER OF AGRICULTURE

IN the province of Quebec, everything pertaining to agriculture, even the school fairs, is under the direction of the Department of Agriculture, but I may say that we receive the fullest co-operation from the Department of Public Instruction and school inspectors, as regards the teaching of agriculture in schools, the organization of competitions and of special lectures for school children.

Macdonald College takes special care of the English population of the

province, conducts a large number of researches and experiments, organizes short courses of agriculture, in the college or outside, and visits farmers.

The agricultural schools of Ste-Anne de la Pocatière and Oka also do considerable work among the farmers, organizing short courses in the college or outside. These three institutions work hand in hand with the Department of Agriculture and, when necessary, lend their teachers.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE

IN reference to the administration of agricultural work in the province of Ontario the plan is a very simple one. All the agricultural work comes under the Department of Agriculture presided over by the Minister of Agriculture. This includes the administration of the Ontario Agricultural College, the Ontario Veterinary College, the proposed new Agricultural School at Kemptville, and the Experimental Farms that are conducted in two or three sections of the province. At the same time the Agricultural College and the Veterinary College are affiliated with the University of Toronto for academic purposes, and the degrees for the final year are presented by that university. This arrangement works out most satisfactorily, giving to the students any prestige accruing from association with the larger seat of learning, but entering into the administration only to the very slightest extent. Ten years or more ago the Government appointed a commission to investigate the general subject of university education in the province. That

commission devoted some attention to the Ontario Agricultural College and the system by which it was administered. They came to the conclusion that the system was working so satisfactorily that it was undesirable to make any change, and consequently it has been continued since. Both of these educational institutions, the Agricultural College and the Veterinary College, are presided over by presidents who are responsible directly to the Minister of Agriculture. In the discharge of their duties they are of course extended the maximum of freedom, the Government merely retaining such control as is essential on behalf of the people, who contribute the money for the support of these institutions.

THE RESEARCH WORK

In addition to the academic work carried on, the research work is also a branch of college activities, particularly of the Ontario Agricultural College, and it is administered in the same way, except that it does not come under the university authori-

ties. Practically all the extension work of the Department is directed from the head office of the Department at Toronto. The services of the staffs of the colleges and farms are available to a limited extent in carrying on this extension work. There is the closest co-operation between the officers in charge of the extension work and the professors and experimental staff of the colleges and farms. In this way the work is carried on with a minimum of duplication and a maximum of effectiveness.

All this does not of course in any way affect the jurisdiction of the Department of Education, which has the administration of the other educa-

tional bodies in the province—public schools, high schools, collegiate institutes, universities. The Department of Education has its own plans for the instruction which is given in these various grades, and they naturally have entire control of the instruction given in the public and high schools in agriculture, just as in other branches of science. In planning the agricultural work there are naturally conferences between the officials of the Department of Education and the Department of Agriculture, so that the former may have the benefit of the special training of the latter.

MANITOBA

INSPECTORS' COMMITTEE—BOYS' AND GIRLS' CLUBS

BY R. FLETCHER, B.A., DEPUTY MINISTER OF EDUCATION

THIS Department is in close co-operation with the Extension Department of the Manitoba Agricultural College, and everything relating to agricultural education affecting pupils in our schools is submitted to us for approval before it is put into effect.

Following is a report of a special committee appointed last October which has been dealing with the matter of the most efficient method of co-operation between our field forces and the other authorities

INSPECTORS' CONFERENCE COMMITTEE

Appointed October, 1917, re Boys' and Girls' Clubs.

DRAFT REPORT

1. Organization of Club.

Each inspectorial division should be divided into club districts by the inspector of the division. At a meeting in each club district of the teachers and trustees of each school and representative citizens such as officials of the Agricultural Society, Home Economics Society, Municipal Council, Grain Growers, Horticultural Society, Poultry Association, etc., a Central Boys' and Girls' club executive should be organized with the following officers: presi-

dent, vice-president, club organizer, and an executive of three others. Every teacher should be a vice-president. The inspector will be a member of the executive *ex-officio*. Three members of the executive will form a quorum.

Duties of Officers.

The inspector's connection is general and supervisory. The president presides at all meetings of the executive. The vice-president acts as organizer for the local district, forms a local club with a president and secretary, who shall be *bona fide* residents of the school district, endeavours to encourage and inspire its officers and members with the right aims and proper attitude toward the various activities of these clubs, exercises a wise and watchful care over its life and work, and acts in an advisory capacity to its executive, of which she is, *ex-officio*, a member. She also, when possible, attends the meetings of the central executive, and is prepared, if called upon, to take upon herself the duties of the president in his absence.

The club organizer is also secretary-treasurer of the central club and the medium of communication between the local clubs and the head of the extension service. Through him all communications and supplies are forwarded from the Extension Service to the secretaries of the local clubs.

The other members of the executive, besides aiding in executive meetings along with the aforementioned officers, take ac-

tive control of one or more of the contests at the annual fair.

The local club is controlled by an executive committee of three—a president, a secretary, and the teacher. The president presides at all meetings of the club and executive. The secretary keeps all minutes and records of members and contests in which each enters, reports these to the central organization, conducts all necessary correspondence, and arranges for the receipt and distribution of all supplies. The teacher also acts as treasurer when there are any funds in the local organization, unless a treasurer for this purpose is locally appointed.

(Variations from the above may be made, in matters of detail, at the discretion of the inspector.)

2. Educational Policy.

The inspectors have observed that the contests as conducted hitherto have been made interesting and attractive to young people. There is no doubt that the success of the movement has been due in a great measure to the fact that the appeal is made to the practical, constructive, economic, and acquisitive instincts of boys and girls. Some fears have been expressed to the effect that the Boys' and Girls' club contests, appealing so strongly to these interests, might interfere with the success of the regular school work. Up to the present time, however, no such result has been observed. On the contrary a number of cases have been mentioned in which the regular school work of the pupils who had actively competed in contests and fairs was pronounced quite satisfactory. It is the opinion of some observers that active participation in club work tends to improve the work of the school in its regular branches. Time and experience alone can prove the ultimate value of the movement in this respect, but at present the omens are favourable.

These contests seem adapted, as already said, to fostering a greater interest in country life and farming activities, increasing the children's knowledge of the vital and mechanical processes of agriculture and home making, cultivating skill in the operations of the farm and household, and generally developing the industrial and commercial interest of young people and their industrial and commercial intelligence and acumen.

This is vocational training. It is frankly individualistic in tendency and chiefly concerned with economic productive capacity. But the inspectors are of opinion that the above statement does not exhaust the educational possibilities of Boys' and Girls' club work. They believe that something more might be done to give effect to the socializing and liberalizing value of education along agricultural lines. The

contests might be improved in an educational sense by reducing somewhat the individualistic appeal. Team work and helping the other fellow should occupy a far larger place than it now appears to do. The inspectors are of opinion also that in the management of contests and fairs a great emphasis should in future be laid on fine art.

3. Management.

(a) To the end that these educational advantages may be secured, understanding on the part of the boys and girls is essential. They should be directly taught that, while they are in a keen contest, they are in reality co-operating with their opponents for the benefit of all. This principle should be constantly in the minds of all teachers and officers associated with Boys' and Girls' clubs, so that it may be impressed on all members.

(b) While the prizes granted are an incentive, the various contests afford a direct opportunity for teachers and officers to impress on the boys and girls the greater importance of conscientious effort, of generous appreciation of the worth of opponents' efforts, and of courage, cheerfulness, and perseverance under disappointment.

(c) Having in view the relative importance of various kinds of educational activity, the evil of over-absorption in one branch to the detriment of others, and particularly the danger that club contests might be allowed to engross all or nearly all of the spare time of the pupil, thus depriving him of necessary family and neighbourly intercourse and the performance of social duties generally, it is deemed desirable to limit the number of contests that they should be permitted to enter. Two or three contests should be the limit in most cases. The choice of the contests should be made as early in the season as possible, but the pupil may be permitted, within a reasonable time, to alter his choice, if he should deem it advisable to do so. After a certain date, preferably fixed by the local club, no change of choice should be permitted. In conducting these tests, the social side of the child's life should not be lost sight of, and if in the performance of the work connected with the club contests he is permitted to take up a burden too heavy for him to carry, or if the work interferes with either his regular school duties or his social duties, the primary aim and object of the contest is defeated.

Care should be exercised in conducting these contests not to over-emphasize the commercial side. The chief aim should be to call forth the pupil's best effort and to encourage sustained effort in whatever choice he makes. It should also be strongly emphasized that the exhibits of the contestants must be the result of their

own efforts. Absolute honesty must be demanded from every contestant.

(d) Contests which are professedly on a money-making basis should not be bolstered up by grants of free supplies or supplies furnished below market price. Business loans or credit can always be secured from the local banker or the Extension Department where necessary. In other contests a liberal policy of assistance should be adopted.

(e) In each local club there should be a prize of no monetary value, to be given to the member who receives the largest number of votes of his fellow-members as having exhibited throughout the year the most sportsmanlike, helpful, neighbourly, unselfish and courteous spirit.

(f) As regards meetings of members of the Boys' and Girls' clubs, it is believed that such gatherings would be beneficial if social, literary, and cultural interests were the chief features thereof.

(g) A policy of generous, financial support by the Extension Department would be of great benefit in the case of clubs now in the course of formation in districts where it is difficult to secure financial aid.

(h) The members of the Extension Staff available for work among the various clubs should, during the month of January in each year, communicate with the inspectors of the division to which they have been assigned in order that their work may be directed to the best advantage.

(i) Bound record books formed to contain records for a series of years, showing contests, entries and prizes won by individuals and teams of boys and girls should be provided and kept permanently in each school.

Co-operation with Extension Department.

The inspectors are prepared to undertake the general supervision of the work of Boys' and Girls' clubs and to act in conjunction with the Extension Department in the formation of plans for the furtherance of the work. A committee of the inspectors will meet with a representative of the Extension Department at least once a year, after the fall conference of the inspectors, to decide on the plans for the following year. These plans if approved by the advisory board of education should be printed in a special bulletin, or as an appendix to the programme of studies.

SASKATCHEWAN

THE arrangement of work as between the Departments of Agriculture and of Education and the university is practically the

same as that obtaining in British Columbia, and which is outlined in this series of articles on the next and the succeeding page.

ALBERTA

BY JAMES MCCAIG, M.A., EDITOR OF AGRICULTURAL PUBLICATIONS

RESEARCH work pertains to the university except that in our provincial agricultural schools, which are set in between the university and the public schools, there is some research and experimental work carried on.

With regard to systematic agricultural instruction, we have a faculty of agriculture in the university and, besides this, a series of agricultural schools, at present three in number, which give five months' courses, extending over two years, to country boys and girls 16 years of age. The agricultural schools are administered by the Department of Agriculture. With regard to popular and short course instruction, this

work is administered and organized wholly by the Department of Agriculture.

The university and Department of Agriculture co-operate to the fullest extent possible in all kinds of lecture and instruction work. Officials of the Department assist with university classes, and instructors from the university assist in the work of the Department.

A special text book to meet western conditions has been prepared for use in the public schools, of which the writer of this article is the author. The school-garden work is wholly in the hands of the Department of Education and is encouraged by special grants. The Department

of Education also co-operates with the Department of Agriculture in the work of the district agents, which up to the present has been largely taken up with organizing home gardens and conducting school fairs. This co-operation is effective, though it is not organized, or established, by regulation.

The Department of Education gives special courses in agriculture as well as other subjects to fit teachers

for their work.

The teaching of agriculture by the Department of Education as secondary school work is limited to teaching and directing a course in the high schools, which is compulsory for those taking the teachers' course. It is supplemented by demonstration garden plots at the high schools, but the laboratory feature of the work cannot be said to be very well developed as yet.

BRITISH COLUMBIA

BY L. S. KLINCK, B.S.A., DEAN, COLLEGE OF AGRICULTURE

FOLLOWING a meeting of the representatives of the Department of Agriculture, the Department of Education, and the University of British Columbia, held at the request of the Honourable the Minister of Education, on November 9th, 1917, to discuss questions affecting the general policies of the different branches represented, a second conference was held on November 13th to consider the practical effect of the application of the principles agreed upon at the previous conference. As a result of these conferences two general principles were decided upon, viz.:

(1) That all agricultural research, whether conducted at Point Grey, or at some other centre, or centres, in the province, be under the university authorities.

(2) That all courses of agricultural instruction exceeding three days' duration, in which particular emphasis is placed on the science underlying the principles taught, be conducted in future by the University rather than by the Department of Agriculture.

In addition to these principles the following matters affecting one or more of the Departments represented were agreed upon:—

(1) That the Department of Agriculture continue to assume responsibility for all activities at present conducted by it, as outlined in its tenth annual report, with the exception of short courses exceeding three days' duration, and all research work in agriculture and in those sciences upon which agriculture is based.

(2) That researches now being conducted by the Department of Agriculture be continued until such time as the University is prepared to assume responsibility for investigation work at different centres in the province.

(3) That representatives of the University hold field meetings to discuss results of investigations obtained at centres in which researches are being conducted.

(4) That the Department of Agriculture conduct all illustration and demonstration field work.

(5) That the Department of Agriculture conduct all work having for its object increased agricultural production.

(6) That the Department of Agriculture continue to publish popular bulletins and circulars of instruction, whether prepared by officials of the Department or by members of the staff of the University.

(7) That representatives of the Department of Agriculture and of the University confer before undertaking any new work in which the application of the two guiding principles adopted is not perfectly clean.

(8) That the fullest measure of co-operation between the University and the Departments of Agriculture and of Education be continued, including the interchange of instructors whenever deemed advisable by those immediately responsible for the conduct of the work.

(9) That continuation classes in agriculture under the Department of Education be open to students of both sexes who have attained the age of fifteen years.

(10) That a tentative arrangement be arrived at between the Department of Agriculture and the Department of Education whereby the minimum age limit for membership in boys' and girls' clubs be fixed at eleven years for 1918 and at twelve years for 1919; also that the scope of the competition in these clubs be extended to include special projects for girls.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITY

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY

THE Department of Agriculture has recently held two unusually successful short courses, one at Guysborough during the week beginning January 27th, and the other at Arichat during the week beginning February 3rd. These were the first short courses ever held at the above-mentioned places, each of which is over 20 miles from the nearest railroad point. The average attendance during the Guysborough course was 100; the attendance for Arichat is not yet known.

At the larger centres, where short courses have been held before, the Department has this year been compelled to reduce and conduct what are known as "Rally Days"—one full day at each place. Two hours are devoted to live-stock judging, a similar period to seed judging and selection, and the balance to the discussion of special problems bearing on the 1918 food production campaign. Frequently arrangements are made for a sort of picnic during the day, the farmers bringing their lunches, and tea and coffee being supplied by the local organization. There is thus an opportunity during the intervening hours for the farmers to talk over matters in general with the instructors.

In response to most urgent requests from different parts of the country, the Department is holding the most extensive series of evening meetings ever conducted in Nova Scotia. The speakers are posted on the situation with regard to the supply of seed and fertilizer for the coming year and are making a special effort to get farmers to buy their supplies at once. They are also

spending their time during the day in visiting business firms and in getting detailed information as to the supply that they have on hand of seeds and other agricultural materials. It is hoped that as a result, the Department will have very specific information as to possible supplies for next spring.

Three food production bulletins have recently been published and widely distributed. The first two of these were mentioned in last month's resumé; the third deals with the question of bigger implements for the farmer, and was written by Prof. J. M. Trueman of the Agricultural College.

ENTOMOLOGICAL DEPARTMENT

Prof. W. H. Brittain, head of the department of entomology, reports on "Potato Spraying Demonstrations and Experiments" as follows:—

Most of the work in potato spraying carried on by the Department in the summer of 1917 was in the nature of demonstrations, since the value of spraying in destroying insects and preventing blight has been long known. Owing to the very severe outbreak of potato blight that occurred last season, the results secured were very striking. In all the cases the crop produced on the sprayed plots was greatly increased. In some cases it was doubled, in others trebled, and in some the unsprayed potatoes were scarcely worth digging. The percentage of unmarketable potatoes was much greater on the unsprayed lots and the proportion that rotted in storage was a great deal higher than in the sprayed plots.

At Truro a number of experiments were carried on to determine whether arsenicals used in the ordinary strength have any fungicidal value; what effect the addition of poisons has upon the fungicidal value of the Bordeaux mixture, and whether the toxic value of the poisons was affected any

by using it in combination with the fungicide. From the results obtained, it could not be said that the various poisons affected, either favourably or otherwise, the action of the fungicide. There was some variation in results secured, but none that appeared to be attributable to this cause. It was not found that any of the poisons used in the ordinary strength have any noticeable fungicidal value, though it appears that some of them, when used double or treble the ordinary strength, have a marked fungicidal value. It was found, however, that the toxic value of all the poisons was less when used with Bordeaux than when used alone, the reduction varying with the different poisons and with the different dilutions. In other words, all the poisons were less effective when used with Bordeaux mixture than when used alone and greater amounts of poison were necessary to produce the same effect.

The toxic value of the different arsenicals was also tested, dilutions to give equivalent quantities of arsenic in each being employed. The results varied considerably with weather conditions. In fine weather calcium arsenate, weight for weight of arsenic oxide, proved most effective, but, if followed by heavy rains, arsenate of lead alone, arsenate of lead and Paris green combined, and arsenate of zinc were superior. Owing to the much lower cost of arsenate of lime in Nova Scotia, this arsenical would appear to be the best to use for next season.

TURNIP PLOT WORK

H. S. Cunningham, B.S.A., District Representative for Cape Breton Island, gives the following report on

the introduction of turnip growing in that district by means of demonstration plots:

One feature of the District Representative work in Cape Breton has been the demonstration turnip plots. This work has been carried on for five seasons with very satisfactory results. This season some 16 plots were seeded in different parts of the island. These plots varied in size from one-half to one acre. The plots were all seeded to one variety, namely Sutton's Champion. This variety has given splendid results and has proven a good keeper. An effort is made to begin seeding about June 1st, and to have all plots seeded by June 20th, if possible. Thinning is commenced as soon as the third leaf is well developed.

The average yield per acre for the past season was 929 bushels per acre, the highest yearly average for the five-year period. The average yield per acre on all plots for the five-year period was 833 bushels, which is very creditable.

These plots have proven a great stimulus to root growing in Cape Breton Island. When this work was started, it was the exception rather than the rule to see turnips grown outside the garden plot; while now nearly every farmer has a good sized field. The farmers have come to realize the value of the turnip as a feed for stock, and, with the present high price of mill feeds, are planning to increase their acreage of this crop the coming season. Not only have these plots been of great value in this respect, but they have also served as a starting point for other work in the communities where they have been established.

NEW BRUNSWICK

FARMERS' CO-OPERATIVE CREAMERY COMPANY

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

MONCTON is a thriving railway and manufacturing centre. The counties of Albert, Westmoreland, and Kent have a large area of agricultural land and people interested in live stock, but without any modern or advantageous marketing system for dairy products. A large amount of butter has been made by the women on the farms. Moncton has had no permanent and definite supply of dairy products,

except through outside channels. Here was a home market and the supplies near at hand, but organization was required in order that the producer and the consumer might meet without any intermediate exchanges.

A campaign to arouse public opinion was carried on last fall throughout the three counties, and at every meeting a committee was appointed to canvass for shares, and

two of that committee were to represent the district at a meeting to be held in Moncton at a later date. The prospectus called for a cream gathered creamery, operated by a company with an authorized capital of \$25,000, of which \$10,000 was to be paid up in \$25 shares, but no man could hold more than 20 shares.

The organization meeting was held on December 27th. The company was formed with the following directors: Messrs. Trites, Fawcett and Melannson, to represent Westmoreland; Messrs. Ryan and Colpitts, for Albert, and Messrs. Breau and Melannson, to represent Kent county. At a later meeting Mr. Trites was elected President of the company. Messrs. Trites, Fawcett and Breau were appointed a committee to transact all business preparatory to the operation of the

factory. A large brick building, centrally located, was purchased. A retail butter and buttermilk trade will be carried on, and, at a later date, undoubtedly other dairy products will be handled. A cold storage plant will be installed.

Mr. J. P. Simmons, of Dunstaffnage, P.E.I., has been engaged as manager, and will also be secretary-treasurer for the company.

The office of the District Representative will be in the creamery building. Thus the work of the provincial Department of Agriculture will be closely co-ordinated with that of those who have undertaken the management of the creamery. Much time and assistance have been and will be given by the Dominion Dairy Division and by the provincial Department of Agriculture.

ONTARIO

BUTTER GRADING IN 1917

BY JOHN H. SCOTT, OFFICIAL GRADER

FROM time to time, up to the early part of last year, Toronto butter dealers and others had made representation to the Ontario Government, suggesting that butter made at the creameries should be graded. Acting on this suggestion, at the last session of the legislature, \$80,000 was included in the appropriations to purchase dairy products for grading purposes, and to meet the expenses in connection therewith. The butter was to be bought from the creameries and resold. By this method, the Government expected to almost entirely recuperate itself for the outlay. Following the adoption of this policy, the writer was appointed official grader. The Dairy Branch of the provincial Department of Agriculture rented accommodation from the city of Toronto at the municipal abattoir.

Having now been engaged in the work for practically a year, I am in a position to run over the

ground that has been covered.

It had been found that 14-lb. boxes were the most suitable for shipping samples. These were furnished by the Department at cost price, and the express charges were paid by the Department. On arrival at the grading station, the samples were first placed in a cooler at a temperature of about 30 degrees and held over night or until scored, so that the samples should be under the same conditions exactly as far as temperature was concerned. After scoring, the samples were placed in the freezer at a temperature of from 5 to 10 degrees below zero and held there. They were held in storage according to agreement with the creameries, for at least one month, so that in case of an appeal against the score the sample would be available for rescoring. A grade certificate was mailed immediately after scoring to the creamery. The score card used is the standard usually used at On-

tario exhibitions, viz.: 45 points for flavour, 25 for body and texture, 15 for colour, 10 for salt, and 5 for finish.

The standard of grades used was 92 points and over, first grade; 87 points and under 92, second grade; 82 points and under 87, third grade, and under 82, off grade or culls. In scoring the butter, the basis was the grade to which the butter belonged commercially, not from an exhibition stand point. As there are 45 points given for flavour, defects in flavour were of the most importance, and the grade in which the butter was put was most often decided by the flavour.

From the creameries in the regular grading service 3,299 samples were graded; 82.16% were placed as 1st grade, or scoring over 92 points; 17.82% under 92, or second grade; and 28.15% scored 94 points and over.

	Scored 94 & over	92 to 94	Under 92
May.....	12%	65 $\frac{3}{4}$	22 $\frac{1}{4}$
June.....	29 $\frac{1}{2}$	53	17 $\frac{1}{2}$
July.....	34 $\frac{3}{4}$	48	17 $\frac{1}{4}$
August.....	18	54 $\frac{1}{2}$	27 $\frac{3}{4}$
September....	25	60	15
October.....	40	54 $\frac{1}{2}$	5 $\frac{1}{2}$
November....	4 $\frac{1}{2}$	72	23 $\frac{1}{2}$

This table shows the month in which the sample arrived at the grading station, not the month in which it was made. Thus it appears that the greatest percentage of poor butter is shown in August. This is accounted for, by the fact that the last ten days of July were extremely hot, but most of the butter made in that period arrived at the grading station in August.

In looking over this table, the effect of the weather condition on the quality of the butter is very noticeable, October showing the best quality, when conditions were ideal as far as feed and weather were concerned.

The most common defects in flavour were "heated", "sour", and "yeastily" flavours, with "fishy" and

"rancid" flavours developing in storage. Looseness and weak body were the most common defects in texture, with a great number of samples showing excessive free moisture. This does not mean that the butter contained more than the legal standard of 15% water, but very often shows the opposite by actual moisture test. Excessive free moisture is a serious defect in butter from a commercial standpoint. It not only makes a "sloppy" or "mushy" textured butter, but is the cause of great loss in shrinkage to the trade in storage, and in cutting out to the retail trade in prints, as the most of our butter is handled to-day. Proper incorporation of the moisture would prevent a great many of the complaints heard of short weight in butter when it reaches the dealer.

Next to the sense of taste the colour of butter is of importance to the consumer. Evenness of colour is required, and a large percentage of butter shows just a little freckle, or waviness, that leaves a bad impression, even though the flavour may be good. It would scarcely be wise to place a mottled or streaked butter in the first grade, no matter what good qualities it may otherwise possess. A great variation in the salting of butter was noticed, full points were allowed for salt unless the salt was gritty or undissolved. Each creamery claimed that they were salting for the requirements of the trade to which their butter goes.

The Department asked the creameries not in the grading service, to send in three samples made the last week of August, and three the last week in September, for the purpose of getting a general idea of the butter being produced throughout the province, and, also, for the purpose of making further investigations regarding salt and moisture content. Fifty creameries responded, sending in 259 samples. Of this lot 68% scored 92 points or over; only 6 $\frac{1}{2}$ % scored 94 or over, and 31% less than 92.

Taking the whole season's grading of regular creameries through the early fodder season, extremely hot summer weather, and late fall stable flavours, it was found that there were 14% more first grade, and 20% more

scoring 94 points and over, than were secured from creameries that were not in the regular grading service, and that from butter made during ideal autumn weather.

THE POTATO EXTENSION SCHEME

BY JUSTUS MILLER, B.S.A., ASSISTANT COMMISSIONER OF AGRICULTURE

IN THE AGRICULTURAL GAZETTE for December, 1917, there was printed an account of the various steps which had been taken in our potato extension scheme up to the time a special committee sent a number of recommendations to the Minister of Agriculture regarding a definite policy, in this regard, for Ontario. The following is an account of how these recommendations have been ratified by the Minister of Agriculture and acted upon by officials of the Department:

STANDARDIZATION OF VARIETIES

The recommendation by the committee was adopted by the Prime Minister as it stood. The Ontario Department of Agriculture is especially recognizing and encouraging the Irish Cobbler as an early variety, with the Early Ohio as a special variety for market gardeners, and the Green Mountain as a late variety with such varieties as Carmen No. 1, Dooley, Rural New Yorker, etc., for those districts where these latter varieties have been grown generally and have been found most satisfactory. No legislation is to be attempted in this regard as the campaign must be largely educative. At any time a new variety may be propagated which will be superior to all other varieties and which would defeat the object of any legislation passed at the present time defining any one variety in a legal sense.

Certain important features of the educational campaign to be carried on in this regard are as follows: (1)

Agricultural associations will be advised to recommend one of these recognized varieties for use in standing field crop competitions and to insist that the members taking part in the standing field crop competitions shall, in each locality, confine their efforts to some one variety. (2) Agricultural societies will still further be advised to offer substantial prizes at fairs and exhibitions for these recognized varieties with small prizes for a general a. o. v. class. (3) Members of the Junior Farmers' Improvement Association will be required to grow but one variety in one locality in acre profit competitions. (4) In the scheme of assisting farmers to secure Northern grown seed as herein after described, only these recognized varieties will be purchased and only one variety in any one locality.

SECURING NORTHERN GROWN SEED

The Ontario Department of Agriculture has decided, as a matter of definite policy, to encourage the planting of Northern grown seed in Old Ontario, especially the seed purchased in Northern Ontario. To this end 598 bags of the varieties mentioned have been bought in New Ontario, and 1011 bags in New Brunswick, a total of 1609 bags, all to be used for Departmental purposes as follows:—(1) Some 40 acres of potatoes are to be grown this year on farms owned by the Ontario Government in Northern Ontario. At the Fort William Farm a quantity will be grown sufficient to meet future requirements of the Ontario

Department of Agriculture. On the Burwash Industrial Farm a large area will be grown for distribution of first class foundation stock to Northern farmers, and on the New Liskeard and Monteith Farms, smaller areas will be grown for the same purpose. (2) A quantity of this seed will be used by District Representatives in practical field demonstration. These will be of the following nature: Each Representative will secure three lots of seed of the Irish Cobbler variety and of the Green Mountain variety. One lot will come from New Brunswick, one from Northern Ontario, one from Old Ontario. Each lot will be sufficient to plant a tenth of an acre. These will be grown side by side to demonstrate the value of Northern grown seed. (3) A thousand farmers will be supplied with small lots of seed by the Experimental Union to conduct this same demonstration on their own farms. (4) Some nine thousand school children of the province will be supplied with small lots of Northern grown seed in connection with school fairs.

The Department of Agriculture has also made arrangements to put Old Ontario farmers in touch with sellers in New Brunswick who can supply seed certified by the Dominion Government to be true to variety and reasonably free from disease. They will be encouraged to purchase in car-load lots only, as freight charges on smaller lots make the price high. The Department is ensuring that four car-lots of this seed be brought to four widely separated districts in Old Ontario, to act as a large field demonstration.

A car-lot of especially high class seed is to be distributed to growers in Northern Ontario as foundation stock. Owing to the heavy freight charges on this Northern shipment, and the desirability of establishing a seed industry in the North of large proportions, the Department is making arrangements to pay the freight on this car-lot.

Owing to the fact that Government inspectors have not been at work in Northern Ontario, it is impossible at the present time to secure much seed that can be guaranteed as to freedom from disease and varietal purity. Next fall, however, there will be a large quantity of seed available which can be certified, as New Brunswick seed is now certified.

GRADES AND GRADING

A committee to study grades and grading has been appointed. The personnel is as follows:—Chairman, Mr. F. C. Hart, Ontario Department of Agriculture; Mr. T. G. Raynor, Federal Seed Branch; Mr. G. W. Collins, Ontario Department of Agriculture; Mr. A. H. MacLennan, Ontario Agricultural College; Mr. S. C. Johnston, Ontario Department of Agriculture.

The purpose of this committee will be to study the grading question thoroughly as it affects the grower, the wholesaler, and the consumer. Present conditions of trade and market demands will be studied thoroughly. Having secured data from these sources, and from all other available sources, the committee will then decide whether or not a standard grade of potatoes is desirable for this province. If this is deemed advisable, the committee will advise the most desirable grade or grades, and will suggest the best ways by which they will become generally adopted.

POTATO SPECIALIST

The duties of the Potato Specialist are as follows:—To have charge of all potato extension work in the province, to co-ordinate the efforts of agencies at present working along these lines, to organize the whole improvement scheme in its broader phases, to prevent duplication of work in any form, to direct educational and publicity campaigns, and to supervise all literature con-

cerning any phase of the potato industry which may be published for distribution by the Ontario Government.

For the time being the Assistant Commissioner is to act as Potato Specialist, his work being largely that of organization. When the work is sufficiently developed to occupy all the time of one man, another appointment will be made.

ADVISORY POTATO COUNCIL

An Advisory Potato Council has been appointed as follows: Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture for Ontario, (chairman); Dr. C. A. Zavitz, Professor Field Husbandry, Ontario Agricultural College; Mr. W. T. Macoun, Dominion Horticulturist; Mr. W. A. McCubbin, Pathologist, Entomological Branch, Dominion Department of Agriculture; Mr. J. E. Howitt, Professor of Botany, Ontario Agricultural College; Mr. F. C. Hart, Director Co-operation and Markets Branch, Ontario Department of Agriculture; Mr. S. C. Johnston, Vegetable Specialist, Ontario Department of Agriculture, and Mr. Justus Miller, Assistant Commissioner of Agriculture for Ontario, who will fill the dual position of acting potato specialist and secretary.

The duty of this council is to act in an advisory capacity with the Potato Specialist, and, with him, to define the policy of the province regarding potato extension work by mutual agreement. The committee will meet semi-annually, namely, on March 1st and October 1st. The chief object in view is a complete co-ordination of all Departments, Federal and Provincial, in the development of the potato industry and the promotion of harmony and efficiency in the work.

At the first meeting of the council all the features of extension work heretofore enumerated were ratified. Besides this, the following work was outlined for the coming season:

(A) *Experiments and Demonstrations.*—Many experiments, many not hitherto conducted, and others much enlarged, will be undertaken, together with those now under way. Sub-stations will be established at Fort William Industrial Farm and at Monteith Farm. So that complete co-ordination of effort may prevail, a committee has been formed of all who will have charge of various branches of this work. The personnel of this committee is as follows:—Chairman, Dr. C. A. Zavitz, Ontario Agricultural College; Mr. W. T. Macoun, Dominion Horticulturist, Central Experimental Farm; Mr. W. R. Leslie, B.S.A., Horticulturist, Fort William Industrial Farm; Mr. W. G. Nixon, B.S.A., Director, Monteith Farm; Mr. R. S. Duncan, B.S.A., Supervisor, District Representatives; Mr. Justus Miller, B.S.A., Acting Potato Specialist. A meeting has been called for February 15th, when a programme of experiments will be outlined.

(B) *Organization.*—An earnest effort will be made to form the nuclei of future co-operative societies in those districts where seed potatoes are bought this spring from Northern districts. In New Ontario this organization will take the form of growers' associations for the purpose of selling seed potatoes. In Old Ontario, the organization will take the form of associations for the purchase of Northern grown seed and the sale of table stock. In the initial stages no attempt was to be made to organize definite co-operative associations with fixed constitutions, by-laws, etc. The preliminary work is to encourage growers in those localities best adapted to potato growing to buy seed so that car-load lots may be sold in the fall. As the efficiency of these methods of production and selling become apparent definite organizations will be effected.

(C) *Educational Campaign.*—This will consist quite largely of practical field work. The demonstrations heretofore outlined, and the inspec-

tors who will travel from farm to farm, will have important results in this regard. Field meetings, somewhat similar to the drainage field meetings will be held at certain points, both in Old and New Ontario, either on the District Representatives' plots, or in fields that are being inspected. A special course in physiological diseases will be given by Professor Howitt, of the Ontario Agricultural College, to District Representatives and others who are interested, next summer. Prof. Howitt will also have charge of the inspection work of all crops grown by the Ontario Department of Agriculture on the various farms of the Ontario Government, and of field demonstrations under the jurisdiction of the Ontario Department of Agriculture. Schools having a course in agriculture will be used to the fullest extent.

Other propaganda, beside practical field work, will be as follows:—

- (1) Meetings will be held in those districts where the potatoes are sold at which experts will discuss fully the potato situation as affected by disease, source of seed supply, etc. Advertisements will be published in the regular way as part of a series being run now by the Ontario Department of Agriculture, explaining the Department's policy in this regard. A bulletin will be published in the near future treating as fully as is consistent with brevity, the influence of physiological disease on the potato crop, and the desirability of Northern grown seed.
- (D) *Research*.—The following lines of research work were agreed upon by the Advisory Council:—
 - (1) The grading question.
 - (2) Economical production.
 - (3) To what extent can profitable production be increased in Ontario in relation to the market situation.
 - (4) What influence will the manufacture of potato by-products have upon the preceding question:
 - (5) The question of transportation.

PROFIT COMPETITIONS FOR 1918

VARIOUS changes have been made in the conditions of the Ontario profit competitions. The first is in the dairy profit, feeding hogs for profit, and acre profit competitions, which were previously restricted to young men under 30 years of age who had taken the course in agriculture conducted by the District Representatives, but which have now been thrown open to all young men under that age, excepting only winners in previous competitions. The choice of a two weeks' course, which constitutes the first prize in each case, formerly limited to live stock and seed judging at the Ontario Agricultural College, has been extended to take in poultry raising, horticulture, farm dairy, bee-keeping, or farm powers.

THE DAIRY COMPETITION

In the dairy competition, the value of butter fat has been raised 20c a pound all round, and is now 50c a pound for the first three months, 53c a pound for the second three months, and 55c per pound for the last month.

FEEDING HOGS FOR PROFIT

In the feeding hogs for profit competition, in addition to the changes previously noted, the basis for the selection of winners has been changed so as to allow 25 points for type and finish, this being done with the bacon hog score card, and 25 points for the best kept records. Formerly, 50 points were given for type and finish and 50 points for the highest net profit per cwt. The latter remains as before. Another

change is that while entries are still said to close on July 1st, the condition is added, "and feeding period must be concluded by December 1st." Formerly, a condition read that each contestant must feed three hogs. Now it is provided that the pen of hogs must contain not less than four. Condition 6, which previously only provided for inspection of the hogs by the District Representative, now reads, "Contestants must notify the District Representative in advance when the hogs attain the age of six weeks, and at the time of entry the Representative will inspect the hogs and mark with ear tag, or in some equally suitable way." Condition 7, in addition to saying that hogs must be weaned at six weeks and fed and cared for by the contestant, now says that an accurate account must be kept of the kind and amount of food consumed every four weeks, in addition to the final feeding. It is also provided that credit will be given those who weigh their hogs at the end of that period, although the weighing is not compulsory. An entirely new provision is the following: "The contestant must notify the

District Representative three days before the hogs are to be finally inspected and weighed, which must be done when they have reached a weight anywhere between 180 and 220 lb. One point will be deducted for each 5 lb. of fraction of 5 lb. under or over these weights. The District Representative, or some one appointed by him, will be present to certify to weights." The ninth condition, which is also new, provides that hogs may be finished any time within 28 weeks of age.

ACRE PROFIT COMPETITION

Condition 6 of the acre profit competition, which formerly said the crop should be decided by a vote of the competitors, now says, "but preference should be given the crop selected by the agricultural societies in the district, so that competitors may enter in the standing field crop competitions." Condition 7 has been changed so that instead of saying the competition must be confined to a field of one acre, now provides for a field of any size, but not less than one acre.

FARMERS' WEEK AT KEMPTVILLE AGRICULTURAL SCHOOL

BY W. J. BELL, B.S.A. PRINCIPAL

THE attendance at the Farmers' Week and Eastern Ontario Provincial Seed Fair held at the Kemptville Agricultural School, January 22 to 25, was far in excess of the anticipations of those in charge of these agricultural meetings, while the exhibits of grain, both in the Field Crop Competition, open, and

C. S. G. A. sections, were of excellent quality.

THE INTER-COUNTY JUDGING COMPETITION

The Inter-County Live Stock Judging Competition was held on the first day of the course. The results were as follows:—

County	Dairy Cattle	Beef Cattle	Horses	Sheep	Swine	Total
1. Glengarry.....	478	386	447	434	432	2177
2. Dundas.....	420	388	439	388	381	2016
3. Lanark.....	440	350	481	310	313	1894
4. Peterborough.....	415	397	427	270	319	1828
5. Grenville.....	286	396	424	299	421	1826
6. Frontenac.....	499	263	401	334	251	1748
7. Carleton.....	449	320	368	233	339	1709

MORNING SESSIONS

The morning sessions, held in the I. O. O. F. Hall, considering the shortage of labour on the busy dairy farms of the eastern section of the province, were well attended, especially by members of the Junior Farmers' Improvement Association from adjoining counties. At these morning meetings such subjects were dealt with as "Feeding and Management of Dairy Cattle," introduced by Prof. A. Leitch, O.A.C., Guelph; "Seed Selection," by T. G. Raynor, Seed Branch, Ottawa; "Fruit Growing in Eastern Ontario," by Mr. W. T. Macoun, Dominion Horticulturist, Ottawa, and "Eradication of Weeds," by Prof. J. E. Howitt, O.A.C., Guelph. Judging by the interest taken in the discussion of these topics, those in attendance received considerable benefit.

AFTERNOON SESSION

Prominent live stock men discussed the judging of the different breeds of stock found in the district at the afternoon meetings, which were held in the Armouries, Kemptville, most of the stock used for demonstration work being obtained from the farm in connection with the Kemptville Agricultural School. The demonstrators at the meeting in the afternoon were, Prof. A. Leitch, O.A.C., Guelph; G. B. Rothwell, Assistant Dominion Animal Husbandman, Ottawa; J. P. Sackville, O.A.C., Guelph, and W. J. Bell, Principal of Kemptville Agricultural School. The attendance every afternoon was large.

EVENING SESSIONS

One of the features of the evening

sessions was the showing of moving pictures of up-to-date agricultural operations and subjects, these pictures having been recently taken by the Moving Picture Bureau of the Ontario Government. In addition to these pictures, two addresses were given each evening by Mr. E. S. Archibald, Dominion Animal Husbandman, Ottawa; Prof. W. J. Squirrel, O.A.C., Guelph; Prof. A. Leitch, O.A.C., Guelph; Mr. W. J. Black, Commissioner under THE AGRICULTURAL INSTRUCTION ACT, Ottawa; Mr. F. C. Hart, Director Co-operation and Markets Branch, Toronto; Mr. J. Reed, Department of Agriculture, P.E.I.; Mr. S. C. Johnston, Moving Picture Bureau, Toronto, and Mr. J. H. Grisdale, Director, Dominion Experimental Farms, Ottawa.

SEED FAIR SALE

At 10.00 a.m. on January 25, an auction sale of the seed exhibited at the Kemptville Seed Fair, was conducted. The bidding was spirited and the sale gave the farmers present an opportunity to purchase some very desirable seed grain. The management of the fair had printed for distribution in the province, a list of exhibitors, showing the variety and quantity of grain each had for sale as well as the price asked. It is believed this will be of assistance to the many prospective purchasers of choice seed grain.

NOTE.—The land purchase, the buildings and equipment of the Kemptville Agricultural School, and the services and expenses pertaining thereto, are financed under the provisions of THE AGRICULTURAL INSTRUCTION ACT.—EDITOR.

SHORT COURSES IN AGRICULTURE AND DOMESTIC SCIENCE

BY J. W. STARK, B.S.A., DISTRICT REPRESENTATIVE, PEEL COUNTY

THE annual short courses in agriculture and domestic science for this district held at Ebenezer, concluded with commencement exercises on the evening of February 1st when prizes were

awarded for general proficiency, stock judging, public speaking, the keeping of notes and essays in domestic science. Mr. J. F. Nixon won the gold medal donated by Mr. W. Bert Roadhouse, Deputy Minister of Agri-

culture. During the four weeks of January, 30 young men met daily to receive agricultural instruction. For two weeks of this period, 45 young women met to study domestic science, food values and cooking, under a graduate of Macdonald Institute. At the conclusion of the course the boys organized themselves into the Ebenezer Junior Farmers' Improvement Association, and the girls into the Junior Institute. It will be the object of these two asso-

ciations to co-operate in various lines of educational and patriotic work and to exercise their abilities in improving the social life of the district. The classes were taken on an excursion to Toronto on January 30th. In the morning the boys visited the stock yards and the girls the Technical School. In the afternoon the full class met at the Parliament Buildings, where they were addressed by Sir William Hearst, Premier and Minister of Agriculture.

SASKATCHEWAN

A NEW LIVE STOCK COMMISSIONER

THE resignation was recently announced of the Acting Live Stock Commissioner for the province of Saskatchewan, Mr. P. F. Bredt, on account of ill-health. Mr. Bredt had been acting since the enlistment in August, 1915, of Captain J. C. Smith, who died on active service in November, 1917. The position of Live Stock Commissioner has now been filled by the appointment of Professor A. M. Shaw, who has been connected with the Animal Husbandry Department of the Saskatchewan Agricultural College since November, 1913. He is a graduate of the Ontario Agricultural College, and from there became District

Representative for Algoma. He was a member of the stock-judging team selected by Professor Day to represent Guelph at the Chicago International Live Stock Exposition. Subsequently, he was appointed assistant agricultural agent for the Great Northern Railway, his special work being to look after demonstration farms and the introduction of live stock along the railway lines through Dakota and Montana. In 1913, the late J. J. Hill, sent Professor Shaw to Europe to select Shorthorn and Ayrshire cattle, sheep, hogs, and horses for his farms in Minnesota.

To-day the world is bleeding to death in its efforts to conquer a false ideal of nationalism, but the only true nationalism, the only true internationalism, is a spirit of mutual sympathy and understanding among all the people—in other words, the spirit of unselfishness which is the essence of the thing we call co-operation. Until we can bring about the birth of that new spirit among the nations, until we can grow it in our own homes, our own communities, our own Dominion, as well cry out to the tides to cease their flowing, as well try to stop the stars in their course as bid wars to cease. Here is work for every individual woman of us, every group of organized women, work in the doing of which you may feel you are bringing perhaps a little nearer that time when there shall be a new heaven and a new earth.—Mrs. Irene Parlbay, President, United Farm Women of Alberta.

ALBERTA

THE CO-OPERATIVE MARKETING OF POULTRY PRODUCTS

BY J. H. HARE, B.S.A., POULTRY MARKETING COMMISSIONER

THE Alberta Department of Agriculture has entered upon a movement to bring about the complete re-organization of the poultry industry in the province chiefly through improved marketing services. Under present conditions, it is hard to find efficiency of any sort, in any phase either of production or marketing. Production, which is approximately fifty eggs per hen per year, is less than one-half of what it should and might easily be, and what production there is, is unnecessarily seasonal; the great bulk of the eggs being produced in April, May and June, when prices are at their lowest level.

Also as a consequence of an evil and antiquated system of marketing in which the principle of non-recognition of quality is the worst feature, approximately fifty per cent of the eggs sent to market in the summer and fall months are No. 2's. No. 2's, according to the trade classification, constitute the fourth and lowest grade. As a consequence of this, there is an unnecessary loss or wastage in the season of approximately forty per cent of the food and money value of the product.

IMPORTANCE OF QUALITY

It is especially the question of the quality of the western product that is seriously in need of the earnest attention of both farmers and egg handlers in the West. It is made the more urgent because of the surplus now being produced in the western provinces, the future of the industry depending very largely upon the profitable disposition of that surplus. Western eggs, unfortunately, are not

in strong demand in outside markets. Last summer in Chicago, a carload of western eggs was held up by the health authorities. On a later date, two carloads of western eggs in Montreal were found to be of such poor quality as to have a marked depressing effect upon the whole market. During the season of heavy holdings, western dealers at times have had the greatest difficulty in making sales, owing to their stocks containing an undue proportion of the lower grades. The following is the average grading, according to the Government Inspector's reports of 14 cars of western eggs, 1917 Spring and Summer Stock:—

Extras 13%, Ones 34%, Twos 44%, cracks, dirties and bad 9%.

British market reports repeatedly quote United States eggs several cents per dozen lower than Eastern Canadian eggs, yet the Dominion Live Stock Branch market report for December 11th makes this significant statement, that "Eastern buyers at present prices and quality express a preference for States eggs as compared with the western product."

POULTRY MARKETING COMMISSIONER'S BRANCH

These facts reveal a condition which is far from being healthy and satisfactory in the western poultry industry, and it was with a view to the organization of work that would aid in the correction of these conditions that the Alberta Department of Agriculture some time ago established the Poultry Marketing Commissioner's Branch.

The efforts of this Branch have

thus far been devoted to the organization and extension of the "Egg Marketing Service," which work is being carried on in close co-operation with the Alberta poultry representative of the Dominion Department of Agriculture.

THE EGG MARKETING SERVICE

The "Egg Marketing Service" has established a Candling Station in the Public Cold Storage warehouse in Calgary, and it is hoped to establish a similar station at Edmonton as soon as practicable. At this service station, shipments of eggs from farmers' associations are received, candled, graded and marketed, and the selling price, less operating charges, returned promptly to the shipping associations.

The objects of the "Egg Marketing Service" can be summarized as follows:—

(a) To provide the farmers of the province, including those in the outlying districts, with the best possible marketing facilities;

(b) To ensure the efficient candling and grading of the product.

(c) To make it possible for the individual farmer to receive a price in proportion to the actual quality of his product.

(d) To ascertain through the examination of the eggs received, what farmers are not following completely efficient methods, so as to be able intelligently to advise them and help them produce a high grade product exclusively.

(e) To stimulate to greater production of poultry and eggs for the benefit of the farmers themselves, as well as for war purposes, believing that this can be accomplished most effectively by providing the farmers with better marketing facilities, such as the Egg Marketing Service will supply; by assembling the farmers' eggs at the service stations and under Government inspection, grading them properly before selling; and by giving the farmer the actual returns his product brings when sold.

(f) To eliminate the tremendous unnecessary loss which the industry now sustains as a consequence of following the present inefficient system of marketing, and to develop an unexcelled reputation

for Alberta eggs. Practical experience both in Europe and in Eastern Canada clearly indicates that this improvement can be brought about most effectively by the adoption of the co-operative system of selling and the establishment of the system of quality payment in making returns to the individual producers, both of which are provided for in the Egg Marketing Service.

It was late in the season of 1917 when the "Egg Marketing Service" commenced operations. Production was dwindling, and many points had no surplus to ship; but, before the conclusion of the season, marketing service was rendered to some twenty odd farmers' organizations throughout the province.

METHODS AND USERS

From the beginning, the principle of quality payment has been strictly adhered to. The eggs upon receipt are graded according to the Canadian standards and returns are made to the farmers on a basis of two grades, making the division during the greater part of the time between No. 1's and No. 2's.

After grading, the eggs are packed in clean, new light cases with new fillers and are offered to the trade for sale. All interested produce buyers are invited to make bids, and the eggs are sold to the highest bidder. In instances where buyers outside of the province quote no higher price than that quoted by local buyers, preference is given to local dealers.

In nearly all cases, shipping arrangements at the various country points have been made by special egg marketing committees, representing one or all of the local farmers' organizations. The organizations already using the egg-marketing service include U. F. A. local associations, farmers' co-operative stores, women's institutes, creameries, United Farm Women's associations, agricultural societies, and a few regularly formed poultry marketing associations.

PART III

Rural Science

THE VARIATION IN ELEMENTARY COURSES IN AGRICULTURE

BY JAMES MCCAIG, M.A., EDITOR OF PUBLICATIONS, ALBERTA

IF we were to take an inventory of the condition of agricultural education in the Dominion at the present time, we would doubtless take satisfaction from finding a rather wholesome condition in public sentiment with respect to increasing and improving our educational services in behalf of agriculture to the fullest extent possible within right limits. We should also find working in our educational services in behalf of agriculture an increasing number of active and enthusiastic men in both popular and systematic work. We should likewise find that the interest of the public and the energy of educational men had found expression in explicit and formal provision in educational institutions for the effective promotion of the science, art, and business of agriculture. In all of the provinces of the Dominion, agriculture has now been given rank with the other great professions in higher institutions of learning. At the other end of the scale, the elementary schools of the Dominion all have incorporated in their courses of studies considerable bodies of work with an agricultural basis, variously called nature study, rural science, elementary science or agriculture. We likewise have secondary school agriculture rather variously represented in educational effort.

There would appear to be an advantage in a discussion of the right functioning and proper province of

the different grades of teaching institutions in dealing with the subject of agriculture. An examination of courses in the different provinces shows wide variation in content and general purpose, or use. Having accepted and established the subject, it would appear to be the next necessary point in progress to more carefully define by either expansion or limitation the appropriate scope of work for the various grades of schools. It is impossible in the first place to get away from the need of having a code or organized body of work. Human progress is constituted of the putting of each generation in possession of the attainments of previous generations in the form of organized knowledge, in the acquisition of which the pupil has a consciousness of increased and progressive power. This is subject in the case of a dynamic unsettled science like agriculture to the need of working close to current development. In this view it is pertinent to ask the framers of courses of study in the elementary schools whether their work is thought to be satisfied by a camouflage of nature study, by explicit vocational teaching of children, by an assembling of beginnings in pure elementary science, by school gardening dominantly, or by organized elementary agriculture.

To give concrete quality to the discussion the practice in Alberta is to pass from a nature study basis to

educational agriculture in grades seven and eight. Agriculture is of concrete interest and embodies the elementary sciences in a way to give cohesion and interest above what may be secured in attempts at pure science teaching. The introduction of agriculture into the schools is a broad social measure which gives reflection of our dominant interest, but is not intended to be a vocational service. The variations in the race are too great and obvious to give warrant to any scheme to make farmers of all country boys. Compulsory attendance till the end of the fourteenth year is enforced, which gives opportunity to enrich the school experience of the Alberta boy with material of some breadth and substance. There appears to be a tendency in Alberta to rather extend the function of the common school well along into the life of the boy, i.e., for two or three years past childhood.

Agriculture is taught in a labora-

tory way. In this view emphasis is given to the following matters:

1. Field work by both teacher and pupils for the study of soils and plants.
2. Experimental work done, both within and without the school-room.
3. The study of the authorized textbook; and of books, magazines and bulletins treating topics similar to those under consideration.
4. The application of the knowledge gained to school and home gardening and to farming operations.

The work done by the Department of Education and the work of the Department of Agriculture are complementary. The District Agents of the Department of Agriculture direct the home gardens and school fairs. The school has its institutional garden. Live stock work is not a part of formal teaching in the schools, but is an important part of the school fair work. The soil and the plant are the characteristic interests of the schools as the materials are everywhere.

MANITOBA

CONSOLIDATION OF SCHOOLS AND AGRICULTURAL EDUCATION

BY S. E. LANG, INSPECTOR OF SECONDARY SCHOOLS

THE Editor of THE AGRICULTURAL GAZETTE has asked for a brief statement showing the extent to which consolidated schools in Manitoba are officered, equipped, and conducted to meet the demands of agricultural education.

There are in the province some 70 consolidated schools employing 229 teachers. Over 3,400 pupils, 300 of whom are of high school grade, are transported to these schools in conveyances provided at public expense, over \$160,000 having been spent in 1917 on the item of transportation alone. Thirteen of these schools do not undertake anything beyond the elementary programme; 44 employ

one teacher in high school work, and the remainder more than one.

Many of these schools are modern, up-to-date buildings, that have been erected with a view to future possibilities as well as present needs. From the standpoint of agriculture the size of the site is important. One school has 17 acres of land, two have ten, one has nine, one has eight, two have seven, six have six, thirteen have five, fourteen have four, five have three, fourteen have two, and the remainder one acre. What has been done at such centres as Stonewall, Teulon, and Roblin, in the way of playgrounds, individual gardens, experimental plots, and

school fields, can no doubt be done elsewhere. Material equipment, in the way of manual training and other tools and implements for illustrative work in an agricultural course, does not require to be very extensive or very expensive.

Hitherto the supply of teachers required to take charge of agricultural departments in local schools of secondary grade has been equal to the demand for such instruction. The consolidated schools should prove very effective instruments in disseminating information of an elementary yet very practical character concerning agriculture over a considerable area through the medium of boys' and girls' clubs and fairs. The Director of the Extension

Service states that there will be fully 200 clubs operating in 1918 with an aggregate membership of 20,000. The system is organized in such a way that the teacher is able to keep in close touch with the club competitions. The school is thus the centre for the dissemination of information upon agriculture, and the home garden and farm the laboratory where the knowledge is applied. In five centres, four of them being consolidated schools, secondary as well as elementary instruction in agriculture was provided for several years. In two cases owing to the enlistment of the instructors the work was discontinued, but will doubtless be resumed later on.

It is generally agreed among educators and others who have the nation's interests at heart that the schools of the country shall continue during the war with as little interruption as possible. At the same time it is felt that the schools shall do all they can to aid in meeting conditions which have grown out of the war. Inasmuch as some of the greatest problems are concerned with increasing the production of food and with conservation in its use, there is a special interest at this time in the teaching of agriculture and home economics. Now, as never before, the nation is appreciating the value of these subjects in the school curriculum. With most educators it is no longer a question of why these subjects should be taught, but as to how they may be taught most effectively.—*H. P. Barrows, Specialist in Agricultural Education, in States Relation Service, Doc. 73, United States Department of Agriculture.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

VOCATIONAL TRAINING IN AGRICULTURE

THE MEANS ADOPTED IN THE UNITED STATES COMPARED WITH THE OBJECTS AIMED AT BY THE AGRICULTURAL INSTRUCTION ACT IN CANADA

PREPARED BY THE STAFF OF THE COMMISSIONER OF AGRICULTURAL INSTRUCTION

IN February, 1917, an Act to Promote Vocational Education was passed by the United States Congress. The measure is commonly known as the Smith-Hughes Act. The Act referred to provides a comprehensive scheme for rendering financial assistance to the states in support of vocational education in the fields of agriculture, home economics, trade, and industry.

Under the Smith-Lever Act, Congress made provision to financially assist, in 1914 and thereafter, extension work in agriculture and home economics through the state agricultural colleges. The Act provided that the work was to consist of instruction and practical demonstrations for the benefit of the farming community generally.

THE SMITH-HUGHES ACT

The moneys appropriated under the Smith-Hughes Act are to be expended in furnishing the education necessary to train for useful employment in agriculture, trade and industry, and in home economics. The training furnished is not to be of college grade, nor in any sense academic, but is to apply to the common, wage-earning employ-

ments. The training may be given (1) to boys and girls who desire to prepare for a selected vocation, and (2) to boys and girls and others who seek greater efficiency and wage-earning capacity in the occupation or trade in which they are already engaged.

It is not proposed that the Federal Government shall undertake the organization and immediate direction of vocational training in the states. The purpose of the measure is to enable the State authorities, in co-operation with the Federal authorities, and with the assistance of Federal moneys, to work out and apply a successful scheme of vocational education, and to set up a proper standard of efficiency in connection therewith.

THE CANADIAN ACT

In Canada, THE AGRICULTURAL INSTRUCTION ACT is intended to assist in the fields covered by the Smith-Lever and the Smith-Hughes Acts. On the one hand, it assists the provinces to meet the cost of carrying instruction to the man on the farm and to the woman in the farm home; on the other hand, it places at the disposal of the provinces

funds that may be used to promote the teaching of agriculture in the common schools and in schools of less than college grade, designed for the purpose of providing vocational education for the young men and women from the farms. Schools of the latter class were allotted the following amounts under THE AGRICULTURAL INSTRUCTION ACT in 1917:

Ontario: Kemptville Agricultural School.....	\$50,000.00
Alberta: Three Schools of Agriculture.....	37,000.00
New Brunswick: Two schools of Agriculture (work in abeyance).....	4,000.00
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	\$91,000.00

For the teaching of agriculture and domestic science in public, high and normal schools, and for the training of teachers to give instruction in those subject, the following allotments were made under THE AGRICULTURAL INSTRUCTION ACT in 1917:

Ontario.....	\$30,000.00
Quebec.....	20,000.00
Saskatchewan.....	25,000.00
British Columbia.....	20,000.00
Nova Scotia.....	10,000.00
New Brunswick.....	9,785.80
Prince Edward Island.....	10,500.00
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	\$125,285.80

LIBERALITY OF THE CANADIAN ACT

While there is a marked similarity of purpose between the United States and Canadian Acts, the application of the funds is much more restricted in the former than in the latter case. The money set aside by Congress under the Smith-Hughes Act for use by the states may be employed only for the salaries of teachers and supervisors, for the salaries of teachers in-training, and for the maintenance of teacher-training. The Act stipulates that the moneys shall not be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings or equipment, or for the purchase or rental of lands, or for the support of any religious or privately owned

school or college. THE AGRICULTURAL INSTRUCTION ACT contains no limitations of this nature. Thus we find that in the current agreement with the province of Ontario provision is made, in connection with the Agricultural School at Kemptville, for "capital expenditure, including land purchase, buildings, and equipment, and for services and expenses pertaining thereto."

HOW U.S. MONEY IS EXPENDED

The principles upon which Federal moneys are distributed under the Smith-Hughes Act are thus stated. The money is designed:—

(1) To stimulate the States to undertake a new and needed form of service—that of vocational education—which the national government believes necessary to the public welfare.

(2) To equalize the inequalities of burden among the States in carrying on this service.

(3) To secure for the national government a reasonable degree of participation in the carrying on of this work in which the national government is so deeply concerned.

(4) To establish standards of efficiency in vocational education in so far as it is aided by federal funds.

The total Federal grant increases from \$1,860,000 in 1917-18 to \$7,367,000 in 1925-26. The appropriation for teachers and supervisors in agriculture increases from \$548,000 in 1917-18 to a maximum of \$3,027,000 in 1925-26. The appropriation for teachers in trade, home economics, and industry increases from \$566,000 in 1917-18 to \$3,050,000 in 1925-26; and the appropriation for teacher-training from \$546,000 in 1917-18 to \$1,090,000, the maximum, in 1920-21. The maximums, when reached, are to continue indefinitely.

The acceptance of the grant is optional on the part of the states, and carries with it specific obligations. Every Federal dollar furnished must be matched by an equal amount appropriated for the same purpose by the state, the local community, or both, in which the Federal money is to be spent.

METHODS OF OPERATION

The machinery established by the Act is devised to secure effective co-operation in promoting vocational education. The law provides for the appointment by the President of a representative Federal Board for Vocational Education. The members of this Board are the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Labour, and the Commissioner of Education, together with three citizens who represent, respectively, the manufacturing and commercial, the agricultural, and the labour interests. To provide agencies representing the states, the act requires that state boards of no less than three members shall be created by legislative enactment. Each state board is to work in co-operation with the Federal Board in carrying out the provision of the Act.

REQUIREMENTS FROM THE STATES

Each state board is required to submit annually to the Federal board a plan outlining the methods by which it proposes to conduct its activities. These plans shall show (1) the kinds of vocational education for which it is proposed that the appropriation shall be used; (2) the kinds of schools and equipment; (3) the courses of study; (4) the methods of instruction; (5) the qualifications of teachers, supervisors, and directors; (6) plans for teacher-training; (7) plans for the supervision of agricultural education, including practice in agriculture either on a farm provided by the school or other farm, for at least six months per year. It shall also be shown that the education is under public control, and that the object is to fit for useful employment. State boards are also required to report annually on the work performed, and to submit a statement of receipts and expenditures.

On the examination and acceptance of the plans by the Federal board, the payment of the grant is authorized. By this means the two

boards are brought together on common ground, and standards of vocational education are established meeting the approbation of both bodies. While the right to establish such standards rests with the state boards, the standards themselves must have the approval of the Federal Board. A state is entitled to receive Federal aid only when it has conformed to the Act and has had its plan approved. No money belongs to any state, nor to any community, as of right. Communities and institutions are entitled to the money only as they show themselves able and ready to meet the requirements of the state board.

THE STAFF

The staff, appointed by the Federal board, consists of a director, who is the executive officer, four assistant directors—one for agriculture, one for industrial education, one for home economics, and one for research—and the regional and other agents. The agent for home economics, however, remains at Washington. The Federal agents are, in general, to act as administrative representatives of the Federal board in the field, to gather information as to the methods adopted by the several state boards for the administration of the Act, and to inspect the work of the state boards in so far as it has to do with the requirements of the law, and the decisions and policies of the Federal board, and with the approved plan of conducting the work.

With regard to the supervision of the work within the states, the Federal board holds that trained teachers and trained supervisors are indispensable in effective vocational education. Only in this way can schools get the help they should have at the time they need it most—when the work of the state is beginning. Furthermore, in this way only can state boards be certain that schools are complying with the terms of the agreement. If the schools of

a state do not live up to the agreement, the funds may be withheld.

The Act contemplates that the Federal board shall make studies and investigations for the help of

the states. To that end it will issue, from time to time, bulletins, circulars and announcements giving the results of studies carried on in its research department.

HYDRO-ELECTRIC POWER ON THE FARM

BY J. W. PURCELL, ASSISTANT ENGINEER, HYDRO-ELECTRIC POWER COMMISSION OF THE PROVINCE OF ONTARIO

IN these days of labour scarcity and high wages, everything possible should be done to place farm production on an efficient and scientific basis. The employment of power machinery has worked, and is working, a revolution in farm methods, and the farm home itself is to-day being equipped in many parts of Ontario with labour-saving appliance and conveniences similar to those found in city homes, including systems of hot and cold running water, electrically driven washing-machines, vacuum cleaners, churns, cream separators, electric irons and electric lighting.

In 1912 the Hydro-Electric Power Commission, appreciating the advantages that would accrue to the province of Ontario if it were possible to apply hydro-electric power to farm work instead of gas and steam power, then being used, made a number of demonstrations beginning in August of that year at the Canadian National Exhibition, Toronto, and continuing at fall fairs and exhibitions throughout the western part of the province at the request of fair boards and municipalities.

THRESHING AND SILO FILLING

In addition to this, two demonstration outfits, consisting of 25

H.P. motors, the necessary transformers, cable, control apparatus and metres were equipped and put into service. With these outfits the cost of doing the heavier work, such as threshing, silo-filling, sawing wood,



SPECIAL FARM HOUSE SCENE
Showing iron, washing machine, table, stove
and chandelier operated by hydro power

chopping grain, etc., has been obtained, and the figures in the following tables are very convincing as to the desirability of electric power for this work. In the tables, the electric power has been charged at 5 cents per K. W. H., and service at \$3 per month, this being the average rate which farmers in different sections of the country are working under:

THRESHING

Table No. 1.—Wheat.

Township.	Farm No.	Condition of grain.	Time at place in days.	Time running—time of delays deducted.	Total in bush.	Total kw-hr.	Bush. per hour.	Bush. per kw-hr.	Kw. hr. per Bush.	Average demand in h.p.	Electric Cost.			Separator	Notes
											Con. Charge	Serv. Charge	Total		
W. Oxford.....	1 Good		$\frac{3}{4}$ 4H-16M		265	87	62.2	3.04	.32	27.2	4.35	.07	4.42	Sawyer-Massey Peerless.	Straw not cut.
W. Oxford.....	2 Good.		$1\frac{1}{4}$ 6H-5M		476	92.5	93.3	5.15	.194	24.3	4.63	.12	4.75	McCloskey.	Straw not cut.

Table No. 2.—Oats.

W. Oxford.....	1 Fair, but tough		¹ / ₄ 11H-15M.		1,179	165	104.8	7.14	.140	19.6	8.25	.17	8.42	Sawyer-Massey Peerless. Straw not cut.
Dereham.....	1 Wet & tough.		¹ / ₂ 8H-20M		1,190	141	143	7.50	.103	22.2	7.05	.15	7.20	McCloskey. Straw not cut.
W. Oxford.....	3 Fair		¹ / ₂ 7H-35M		1,450	198	191	7.80	.136	24.8	8.90	.15	9.05	Geo. White & Sons. Straw not cut.
N. Oxford.....	1 Fair		2 6H-52M		1,140	203	162	5.36	.178	24.5	10.15	.20	10.35	McCloskey. Straw cut.
W. Oxford.....	2 Good, but tough		² / ₄ 13H-35M		2,180	325.5	165	6.69	.150	24.4	16.28	.27	16.55	McCloskey. Straw not cut.

Table No. 3.—Hungarian Oats

N. Norwich.....	1		2 5H-45M.		397	93.	69	4.27	.235	22.8	4.65	.50	4.85 Straw not cut.
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SILO FILLING
Table No. 4

Township	Farm No.	Size of Silo ft.	Capacity in cu. ft.	Amount cut and elevated—tons.	Time at place in days	Time running, time of delays deducted	Total Kw-hr.	Tons per hr.	Kw-hr. per ton.	Pounds per Kw-hr	Average H. P.	Electric Cost.			Name of Cutting Box.	Notes
												Con. Ch.	Ser. Ch.	Total	Per ton.	
N. Oxford.....	214 x 40	6157.6	125.2	125.2	2 110H-15M	197	12.4	1.57	1.268	25.5	9.85	.20	10.05	.085	Blizzard No. 3.	944 Very green.
W. Oxford.....	216 x 45	9047.7	152 ² / ₃	152 ² / ₃	2 16H-14M	275	9.51	1.75	1,109	22.	13.75	.25	14.00	.092	C. Wilkinson.	1000 Fair weather.
W. Oxford.....	183 x 59	12917.5	270	270	2 18H-35M	367	14.5	1.36	1,471	24.5	18.35	.25	18.60	.069	Blizzard No. 3.	944 Silo inside barn trouble with belt.
Dereham.....	115 x 40	7068.4	175	175	3 20H-3M	336	8.75	1.92	1,041	22.4	16.80	.35	17.15	.098	Blizzard No. 3.	944 Rainy weather.
Dereham.....	216 x 40	8042.4	108.2	108.2	2 20H-15M	392	8.4	2.35	939	19.6	19.60	.20	19.80	.105	Blizzard No. 3.	944
W. Oxford.....	314 x 35	5388.	159.2	159.2	2 11H-05M	215	9.73	1.90	1,004	25.9	10.75	.20	10.95	.102	Blizzard No. 3.	944
N. Norwich.....	114 x 40	6157.6	154.2	154.2	2 12H-45M	183	7.5	1.17	1,683	21.5	9.15	.20	9.35	.068	Blizzard No. 3.	790
N. Norwich.....	216 x 37	7489.6	146.1	146.1	2 7H-15M	129	0.1	1.13	2,262	23.7	6.45	.10	6.55	.045	Wilkinson.	790 Rainy weather, silo not filled.
S. Norwich.....	114 x 40	6157.6	154.2	154.2	2 11H-15M	136	12.7	1.13	2,264	16.2	6.80	.20	7.00	.045	Wilkinson.	790 Another silo partly filled.

*Weight of silage taken at 30 to 50 lb. per cu. ft., according to condition.

† Filled 32 ft.

† Silos all round except in one case above referred to as oblong.

VALUE AND ADVANTAGES

The advantages of electric power over other power at present in use are quite apparent to the farmer in most districts. The question with him is how he can apply the power so as to receive full value for the money

that is done by the farmer or his help, or whether it is borrowed help which he has to pay back under the system in vogue of exchanging labour during periods of silo-filling and threshing.

The advantages of electric power for use in silo-filling are evident when



GENERAL VIEW OF FARM SERVED WITH HYDRO POWER, SHOWING FARM SERVICE TRANSFORMERS—SERVICE TO BARN AND HOUSE.

expended.

In order to make a fair comparison between the cost of electric drive and other methods, it is necessary to take into consideration the saving of time effected, whether it is in work

it is remembered that the value of silage depends to a large extent on its being cut and put in at the right time. When the farmer has to depend on steam power, he often has to wait so long for the outfit to come



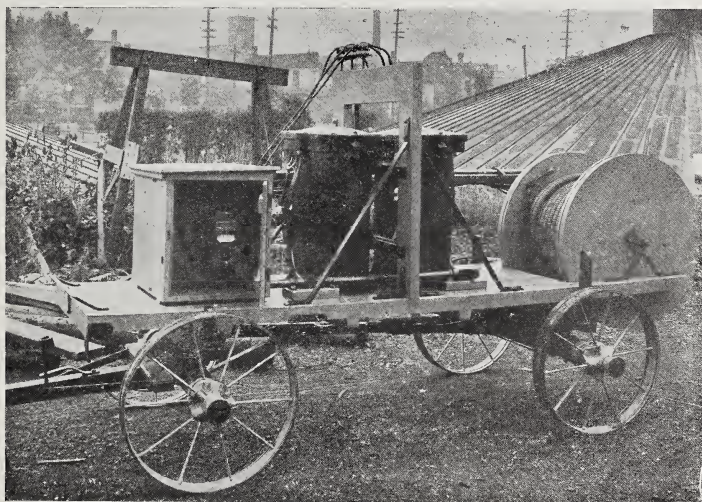
VIEW OF SYNDICATE OUTFIT SHOWING MOTOR AND TRANSFORMER WAGONS. ONE TRANSFORMER IS CONNECTED TO THE LINE AND SUPPLIES CURRENT TO THE MOTOR AT SUITABLE VOLTAGE

around that the quality of the silage is very seriously affected.

NUMBER OF SERVICES

At the present time the number of farm services to rural communities and suburban district in Ontario probably reach a total of nearly five thousand. The counties in which progress has been the greatest are South Oxford, Waterloo, Kent, Ontario, Peel, Welland, Lincoln, Wentworth, Norfolk, Middlesex, and Elgin.

wanting hydro-power to petition the township council for an estimate. The council transmits this petition to the Hydro-Electric Power Commission with a resolution asking that such an estimate be prepared. As soon as the estimate is approved by the Commission, it is sent to the council, who within thirty days call a meeting of the petitioners and submit the estimate. If they so desire, the petitioners then enter into a contract with the municipality for hydro-power, and the municipality



SYNDICATE OUTFIT—TRANSFORMER WAGON—USED BY MEN IN WATERLOO TOWNSHIP

Rural districts necessarily move more slowly than do populous centres, but the policy of the Commission is the same in supplying power to farms and rural municipalities as it is in the case of cities, towns, and villages, that is, "Service at Cost."

HOW SERVICE IS SECURED

If a district is willing to bear the cost, the Power Commission Act provides that service shall be given. The regular procedure is for a group

in its turn enters into an agreement with the Commission for power for the petitioners. The Commission then build the lines to the farmer's gate and the township provides the transformers and metres. Construction is not recommended by the Commission unless there are at least three consumers per mile, the revenue from this number being required to take care of the annual fixed charges on the cost of construction, which includes interest at 6 per cent, depreciation

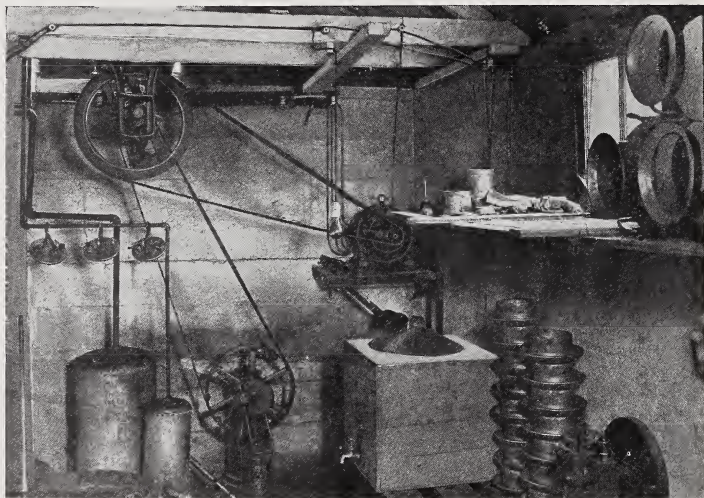
at 5 per cent, sinking fund on a thirty year basis, and maintenance and operation.

THE CHARGES

The rates upon which the consumers are billed are made up of two parts, namely, service charge and consumption charge. The service

cost of power in the district.

The cost of wiring farm buildings varies considerably in different districts, depending on the contractor who does the work and the cost of labour. The average cost of wiring barns in the Waterloo district, from a total of eight places of 100 to 150 acres, during the past season was



AN UP-TO-DATE DAIRY, WHERE THE MILKING MACHINE, WATER HEATER, ETC., ARE OPERATED BY HYDRO POWER

charge depends upon the number of consumers per mile. It is \$3 per month for three consumers per mile; \$2.50 per month for four consumers per mile; \$2.00 per month for five consumers per mile, etc. The consumption charge depends upon the amount of power used. This is measured by metre and is so much per K.W.H., depending upon the

\$110. The cost of house wiring is much less than this.

TABLE OF COST TO THE FARMER

The actual cost to the farmer for power, both for domestic uses and power purposes, is illustrated by the following table covering six farms in Waterloo Township in 1915:—

WATERLOO TOWNSHIP SYNDICATE

Users of Power for Domestic and Power Purposes for 1915.

Kilowatt Hours													Rate—Service charge \$30. Power 4c. per K.W. Discount 10% for prompt payment from power only				
Farm No.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total	Domestic	Power	Service Charge	Total
1	48	35	38	33	21	17	20	30	33	38	59	47	409	\$14.72	\$43.96	\$31.66	\$90.34
2	48	31	23	23	29	55	17	19	25	36	51	54	411	14.80	56.52	30.00	101.32
3	39	49	33	18	10	10	13	12	19	23	36	33	295	10.62	54.68	30.00	99.30
4	31	27	21	23	14	15	16	15	20	38	56	43	319	10.48	29.84	31.66	71.98
5	31	26	23	18	12	12	10	15	21	23	35	27	253	9.11	29.16	30.00	68.27
6	45	17	13	12	6	6	7	13	15	16	7	25	182	6.55	31.57	30.00	68.12
7	On Town System				..	..	..	..	..	..	..	..	..	..	13.57	9.00	22.57
													1869	\$66.28	\$259.30	\$19.32	\$521.90

Power Used by 20 H. P. Syndicate Outfit.

1	73	34	283	..	153	30	648	1221	\$43.96	No record of detail work done.
2	58	..	42	26	59	32	12	131	192	185	745	88	1570	
3	67	..	51	42	10	19	..	89	289	228	267	457	1519	
4	76	..	71	..	..	..	26	107	134	..	363	52	829
5	65	..	..	49	20	..	..	51	245	..	312	68	810
6	..	..	..	..	..	..	..	..	193	114	21	549	877
7	..	..	..	..	..	..	260	..	117	..	..	..	377
													7203	
													9072	

NOTE.—Nos. 1 and 4 now pay an extra service charge of \$5.00 per year from September 1st to December 30th. Average cost per kilowatt hour, including Service Charge:—

No. 1.....	5.542	cents	No. 5.....	6.42	cents
No. 2.....	5.114	cents	No. 6.....	6.528	"
No. 3.....	5.48	"	No. 7.....	6.00	"
No. 4.....	6.27	"			



SILO FILLING WITH 5 H.P. OUTFIT

EXAMPLES OF WORK PERFORMED

The following work was performed on the farms enumerated:—

Farms

- No. 1 —Silos Filling—A 12 x 42 ft. silo was filled to depth of 40 ft. settled.
—Threshing—2,000 bushels mixed grain; 800 bushels wheat; 300 bushels barley.
—Sawed—15 cords (stone length) wood.
—Chopped—2,000 bushels grain.

- No. 2 —Silos Filling—A 14 x 39 ft. silo was filled to a depth of 30 ft. settled.
—Threshing—1,120 bushels wheat; 1,150 bushels mixed grain; 450 bushels barley; 1,000 bushels oats.
—Sawed—12 to 15 cords (stove length) wood.
—Chopped—2,400 bushels of grain.
- No. 3 —Silos Filling—A 12 x 40 ft. silo was filled and settled and refilled.
—Threshing—900 bushels wheat; 1,800 bushels oats; 1,500 bushels mixed grain; 500 bushels barley.

- Sawed—12 cords (stove length) wood.
- Chopped—3,000 bushels grain in the year.
- No. 4 —Silo Filling—two silos were filled—one 10 x 10, and one 8 x 10 x 22 ft.
- Threshing—300 bushels wheat; 1,600 bushels oats.
- Sawed—No record.
- Chopped—1,000 bushels grain in the year.
- No. 5 —Silo Filling—A 11 x 30 ft. silo was filled and settled.
- Threshing—325 bushels wheat;
- 1,550 bushels oats and mixed grain.
- Sawed—16 cords (stove length) wood.
- Chopped—1,100 bushels of grain in the year.
- No. 6 —Silo Filling—a 14 x 40 ft. silo was filled, 24 ft. settled.
- Threshing—700 bushels wheat; 2,000 bushels mixed grain; 300 bushels barley.
- Sawed—10 cords (stove length) wood.
- Chopped— $\frac{1}{2}$ day—about 300 bushels —has windmill chopper.

BABY BEEF CONTESTS FOR BOYS AND GIRLS

BOYS and girls baby beef contests inaugurated in the state of Iowa have added stimulus to baby beef production in that state, and have added a useful factor in the education of the young people. The contest was first organized in 1914. It is open to boys and girls between the ages of ten and eighteen years. It is supervised by the Iowa Beef Producers' Association. The object of the contest is to induce as many boys and girls as possible to take a steer or heifer and feed it for a stipulated period. This accomplished, the contestants feed to get the greatest gain at the least expense. Each contestant must feed, groom, break and show his, or her, entry, and must feed with the idea of having a finished product at the end of the feeding period that has quality, smoothness and bloom, and which will place well in the show-ring. The entire responsibility rests with each contestant.

Co-operating with the state organizations are numerous county and district fairs which are contributing to the success of the work by liberal premiums to contestants in their respective districts. Then there follows the state show at Des Moines, when the calves are all assembled to be judged for quality. That is always the big event, and the show in 1917 would have done credit to many state fairs. Seventeen hundred and fifteen dollars was paid out in prizes, and a free trip to the International was awarded to county winners.

THE RECORDS

Two hundred and ninety-two entered the contest and two hundred and fifty finished. The records of these contestants are very interesting. The contest was based on a ten-months' feeding period, November 1st, 1916, to September 1st, 1917. Calves entered were dropped between January 1st and September 1st, 1916, and pure-bred calves intended for breeding purposes were barred. The final results were based on amount of gain,

economy of gain, and records and reports kept by the contestants. The calves of the 250 members completing the project were on an average feeding period of 294 days, starting with a total initial weight of 106,988 pounds, and finishing with a final weight of 238,289 pounds. The total gain was 131,301 pounds, or an average initial weight of 401 pounds, and a final weight of 892 pounds, making an average gain of 492 pounds.

In figuring the cost of production, standard prices of feeds were sent to all members to be used in making out their reports. The total cost of feeds was \$15,292.28, or an average cost of \$32.08. Figuring the calves at \$13.00 a hundred at the close of the contest and \$8.00 at the beginning, gives a total value of \$33,360.46. The net profit of all members was \$9,569.14, or an average profit per member of \$35.72.

THE INFLUENCE EFFECTED

The educational value, with the increased interest of the contest, has brought about a wonderful influence in the kind and quality of calves entered. Each year finds a larger percentage of high-grade and pure-bred calves entered. More care is taken in the selection of the calf. Special attention is given to securing a good member who is willing to pay what the calf is worth. Special care is taken in choosing a ration keeping in consideration the cost of feeds, individuality of amount and home conditions. Boys that never before took into consideration feed values are now giving this special study. Not only are they learning to feed with excellent results, but are learning to fit their calves for exhibition. Boys that enter the contest with the one aim to win the prize soon learn that there are other things besides prizes that are well worth getting, namely, the educational value and experience. The boy that has taken hold of the club work with a vim and determination begins to take a new interest in live stock production.

ASSOCIATIONS AND SOCIETIES

LIVE STOCK BREEDERS' WEEK IN TORONTO

THE annual meetings of the live stock breeding associations in affiliation with the National Live Stock Records Board of Canada were held in Toronto from February 4th to 8th. As promised by the tables of records and transfers and membership rolls published in the February number of THE AGRICULTURAL GAZETTE, a general tale was told of advancement and prosperity. Many important questions came up for discussion, the majority of which have either already been dealt with in THE GAZETTE or are referred to in the necessarily curtailed summaries that follow. It will be observed that both the Canadian Clydesdale Horse Association and the Dominion Shorthorn Association have arranged for reciprocity in registrations with the United States Associations. The proposed international live stock show in Hamilton and the suggestion that a national organization should be found to take charge of such matters as were of common concern to all the breeding interests of the country, each received attention, and in the majority of instances both were referred to the various executives to be dealt with. The scarcity of labour and the feed questions and the suppression of hog cholera came up for consideration, Federal Government chiefs being present to explain what was being done. With the sheep men, the vital question was the co-operative selling of wool, a matter that has been largely dealt with in THE GAZETTE and action regarding which is recorded on another page. A number of Ontario breeders' associations met in annual session during the same week at the same place.

RECORD ASSOCIATIONS

CLYDESDALE HORSE ASSOCIATION OF CANADA

A tone of optimism marked the annual meeting of the Clydesdale Horse Association of Canada. The director's report, after referring to the depletion of horses in Europe in consequence of the war, predicted that for years following the settlement of peace there would be a demand for well-bred horses. Available statistics showed that the horse population of Canada had increased 400,000 since 1915. In Ontario, however, there had been a decrease of 10,000. Clydesdales had shown an advance, both in quality and number at most of the shows. The financial statement of the Association displayed continual improvement, the receipts having been \$15,418.28 in 1917 against \$12,475.02 in 1916. Allowing for \$5,754.70 paid for war bonds, the expenditure had been

\$10,198.84, which included \$4,050 paid in grants to exhibitors and \$500 subscribed to the Canadian Red Cross fund. The balance at the end of the year, including the \$6,000 worth of war bonds was \$14,106.34. In addition to the money grants, 54 gold medals were distributed among local shows and 22 grand championship medals were given. During the year a settlement of an outstanding difficulty had been made with the American Clydesdale Association. In the past the only Clydesdales eligible for entry for breeding purposes from Canada to the United States were imported pure-breds, or those tracing to imported registered stock on both sides. Now all animals recorded in the Canadian Stud Book can be entered and recorded in the American Stud Book. An arrangement has also been made with the executors of the estate of the late Captain G. L. Watson of British Columbia that the trophy given by him for the best Canadian-bred Clydesdale stallion shall be open for competition annually in perpetuity and shall be known as the Watson Shield. Grants for 1918 were made of \$500 to the Red Cross fund, \$300 to the Y.M.C.A., war expenses and \$6.850 to exhibitors. Wm. Graham, Claremont, Ont.; Jas. A. Torrance, Markham, Ont., and J. W. Wheaton, Toronto; were respectively re-elected president, vice-president and secretary-treasurer. The vice-presidents for provinces were all re-elected excepting that Wm. Grant was elected for Saskatchewan in place of Alexander Mutch and S. A. Logan, Amherst, N.S., was elected for the Maritime Provinces under the new arrangement which combines the three. The representatives on the Canadian National Live Stock Record Board are Wm. Graham, Claremont, Ont.; John Boag, Queensville, Ont.; Robert Ness, Howick, Que.; Wm. Smith, M.P., Columbus, Ont.; Peter Christie, Manchester, Ont.; Fred Richardson, Columbus, Ont.

CANADIAN SHIRE HORSE ASSOCIATION

Officers elected: president, Amos Agar, Nashville, Ont.; vice-president, James Bovaird, Brampton, Ont.; secretary treasurer, G. de W. Green, Toronto; representatives on Canadian National Live Stock Records Board, Jas. Bovaird, Brampton, and Jno. Gardhouse, Weston, Ont.

CANADIAN PERCHERON HORSE BREEDERS' ASSOCIATION

Officers elected: President, W. B. Thorne, Aldersyde, Alta.; vice-president, E. A. Davenport, Acme, Alta.; secretary, W. H. Willson, Calgary, Alta.; representatives on National Live Stock Records

Board; Geo. Lane, Calgary; R. C. Upper, Calgary; W. B. Thorne, Aldersyde, Alta.

CANADIAN HACKNEY HORSE SOCIETY

The secretary of the Canadian Hackney Horse Society at the annual meeting reported a demand for good representatives of the breed. There is a membership of 165 and a balance on hand of \$282.30. The officers elected were: President, Robert Graham, Toronto, vice-president, Dr. E. Watson, Hudson Heights, Que.; secretary-treasurer, H. M. Robinson, Toronto; representatives on the Canadian National Live Stock Record Board: Robert Graham, Toronto; Dr. E. Watson, Hudson Heights, Que.

CANADIAN THOROUGHBRED HORSE SOCIETY

Officers elected: president, Lieut. Col. Wm. Hendrie, Hamilton; vice-presidents, J. J. Dixon and A. E. Dymont; secretary-treasurer, T. J. Macabe, Toronto; representatives on Canadian National Live Stock Records Board, T. J. Macabe and T. A. Crow, Toronto.

CANADIAN STANDARD-BRED HORSE SOCIETY

At the annual meeting of the Canadian Standard-bred Horse Society, the treasurer reported that the receipts up to December 31, 1917, were \$4,155.21, while the expenditures for the year were \$1,193.60. With outstanding accounts, the cash on hand was reported to be \$3,671.59. It was decided to devote \$150 to the Allies Relief Fund. The officers elected were: Hon. President, W. J. Cowan, Cannington, Ont.; president, Geo. S. McCaul, St. Thomas, Ont.; vice-president, Sam McBride, Toronto, secretary, John W. Brant, Ottawa; representatives on Canadian National Live Stock Records Board, Harford Ashley, Foxboro, Ont., and T. H. Hassard, Markham, Ont.

CANADIAN PONY SOCIETY

Officers elected: Honourary President, W. J. Langton, Toronto, Ont.; president, J. M. Gardhouse, Weston, Ont.; vice-president, Dr. E. Watson, Hudson Heights, Que.; representatives on National Live Stock Record Board: J. M. Gardhouse, Weston, Ont.; H. M. Robinson, Toronto; secretary, G. deW. Green, Toronto.

CANADIAN FRENCH COACH BREEDERS' ASSOCIATION

Officers elected: President, G. E. Goddard, Cochrane, Alta.; vice-president, W. B. Thorne, Aldersyde, Alta.; second vice-president, L. J. Schroeder, Midnapore, Alta.; secretary, E. L. Richardson, Calgary, Alta.; representatives on the Canadian National Live Stock Records Board, G. E. Goddard, Cochrane, Alta., and W. B. Thorne, Aldersyde, Alta.

FRENCH CANADIAN HORSE BREEDERS' ASSOCIATION

Officers elected: Hon. president, Jos Deland, L'Acadie; president, Victor Sylvestre, St. Hyacinthe; vice-president, Louis Thoun, Repentigny; secretary-treasurer, J. A. Couture, Quebec; representatives on the Canadian Live Stock Records Board, Victor Sylvestre, St. Hyacinthe, and J. A. Couture, Quebec.

THE DOMINION SHORTHORN BREEDERS' ASSOCIATION

At the annual meeting of the Dominion Shorthorn Breeders' Association held in Toronto, on February 6, a resolution was passed providing for reciprocity and registration between the United States and Canada. It is now possible for an American buyer to purchase a shorthorn of Canadian ancestry and have the registration transferred to an American registry for the customary United States fee of \$1.25. Shorthorns registered in the United States can now also be registered in Canada for the fee of \$1. The financial report showed the association to have \$35,000 invested in war loan bonds, that the total assets were \$58,590.73, that the liabilities were only \$8,000, that the total income last year was \$34,000, that nearly one-half of this was invested in victory loan bonds and that, in addition, the association divided \$1,000 between the Patriotic and Red Cross funds in 1917 and that in 1918, \$1500 will be divided between the Patriotic, Red Cross and Y.M.C.A. funds. The membership of the association was shown to be 2,872, the registrations 16,863, the receipts from registrations in 1917, \$27,181.75, and the receipts from memberships \$5,422. The executive was authorized to expend not more than \$6,000 in publicity work. The following officers were elected: President, W. A. Dryden, Brooklin; first vice-president, J. F. Mitchell, Burlington; second vice-president, J. G. Barron, Carberry, Man.; secretary-treasurer, Professor G. E. Day, Guelph, Ont.; representatives on Canadian National Live Stock Records Board, W. A. Dryden, Brooklin, Ont.; Robt. Miller, Stouffville, Ont.; J. A. Watt, Elora, Ont.; J. F. Mitchell, Burlington, Ont.; Hon. W. C. Sutherland, Galt, Ont.; Harry Smith, Hay, Ont., and Peter White, K.C., Pembroke, Ont.

CANADIAN HEREFORD BREEDERS' ASSOCIATION

The Canadian Hereford Breeders' Association reported an increase in business of about 90%. Especially in the West was there a marked increase in popularity of the breed. The association decided to distribute \$3,000 as prize money between the different fairs and to subscribe \$100 to the Canadian Red Cross fund. The fol-

lowing officers were elected: President, W. H. Hunter Orangeville; vice-president, L. O. Clifford, Oshawa; secretary, H. D. Smith, Ancaster, Ont.; representatives to Canadian National Live Stock Records Board, W. H. Hunter, and H. D. Smith.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION

In his report at the annual meeting held in Toronto on February 8th of the Canadian Ayrshire Breeders' Association, the secretary stated that the membership was now 1521, an increase of 166 over 1917. Of the provinces, Quebec has the greatest number of members, viz., 753; Ontario coming next with 430. The financial report showed the expenditures for the year to have been \$13,746, while the receipts were \$12,107. It was explained that \$1,660 of the expenditures belonged to the previous year. Mr. C. F. Bailey, Deputy Minister of Agriculture, announced that a demonstration Ayrshire herd was being established at New Liskeard. A resolution was passed restricting the record of performance test to 300 days with an extension to 390 days in which the cow under test must produce her calf. After voting \$200 to the Allies Relief Fund, the following officers were elected: President, L. J. Tarte, Montreal; vice-president, A. S. Turner, Ryckman's Corners; secretary, W. F. Stephen, Huntingdon, Que.; representatives on National Live Stock Record Board: W. W. Ballantyne, Stratford, Ont.; John McKee, Norwich, Ont., Wm. Hunter, Grimsby, Ont., W. F. Stephen, Huntingdon, Que.

HOLSTEIN BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Holstein Breeders' Association, it was reported that the registrations during 1917 totalled 12,019, being an increase of 1000 over the previous year. The transfers totalled 10,656. The membership of the association was increased by 382. Certificates were issued for 760 tests under R. O. M. rules and 206 qualified in the record of performance. The balance on hand was reported to be \$2,080.24, with assets of \$24,680.24 above all liabilities. One thousand dollars was voted to be used as prizes in R. O. P. tests. A committee was appointed to deal with the complaint that some breeders were in the habit of having animals transferred to them for show purposes only. The idea of an International Live-Stock Show was approved and a representative appointed to confer with other breeders relative thereto. Both the 300 day test and the 365 day test were approved for R. O. P. work. The officers elected were: President, S. F. Tolmie, Victoria, B.C.; first vice-president, Neil Sangster, Ormestown, Que.; second vice-president, G. A. Brethen, Norwood, Ont.; secretary, W. A. Clemons, St. George, Ont.

CANADIAN JERSEY CATTLE CLUB

Officers elected: President, D. O. Bull, Brampton, Ont.; first vice-president, F. Lea Alexander, Coaticook, Que.; second vice-president, Gordon Duncan, Todmorden; secretary-treasurer, B. A. Bull, Brampton; representatives on the Canadian National Live Stock Records Board, B. A. Bull, Brampton, and R. J. Fleming, Toronto.

CANADIAN BROWN SWISS ASSOCIATION

Officers elected: Honourary President, Arthur Galey, Massawippi, Que.; president, C. E. Standish, Ayer's Cliff, Que.; first vice-president, W. A. Jolley, Waterloo, Que.; second vice-president, Ralph Ballagh, Guelph, Ont.; representatives on National Live Stock Records Board, J. Keffer, Preston, Ont.; Benjamin Bowman, New Hamburg, Ont.; secretary-treasurer, Ralph H. Libby, Stanstead, Que.

FRENCH CANADIAN CATTLE BREEDERS' ASSOCIATION

Officers elected: President, Arsene Denis St. Norbert, Que.; vice-president, Louis Thoun, Repentigny; secretary-treasurer, J. A. Couture, Quebec; representatives on the Canadian Live Stock Records Board, Hon. Sydney Fisher, Knowlton; Hon. N. Garneau, Quebec.

CANADIAN SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Sheep Breeders' Association, held in Toronto, February 6, resolutions were passed, allowing free transfers within sixty days, fifty cents to be charged for transfers made between 60 and 120 days, and voting \$200 to the Empire Relief Fund. The officers elected were: President, W. A. Dryden, Brooklin, Ont.; vice-president, Jas. Bryson, Brysonville, Que.; secretary-treasurer, R. W. Wade, Toronto; representatives on Canadian National Live Stock Record Board: Jas. Bryson, Brysonville, Que., Jas. Snell, Clinton, Ont., Lt.-Col. Robt. McEwen, London, Ont.

CANADIAN SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Swine Breeders' Association held in Toronto on February 4th, Dr. Torrance, Veterinary Director General for Canada, stated that in five years twenty-five million hogs had been lost in the United States, as a result of hog cholera. In Canada, the greatest losses occurred in 1914 and 1915, when there were 34,779 and 34,470 respectively, or a trifle over one per cent of the hog population of the Dominion. Considerable discussion took place on the question of feed. The federal Live Stock Commissioner explained what his Department was doing towards improvement of the situation in this respect. The financial report showed that the receipts from regis-

trations totalled \$9,647.52, and from memberships \$2,840. The officers elected were: President, G. H. Hutton, Lacombe, Alta.; vice-president, F. Byrne, Charlesbourg, Que.; secretary-treasurer, R. W. Wade, Toronto; representatives on Canadian National Live Stock Record Board: J. D. Brien, Ridgetown, Ont.; J. E. Brethour, Burford, Ont.; John I. Flatt, Hamilton; H. German, St. George.

CANADIAN KENNEL CLUB

Officers elected: Honourary President, John G. Kent, Toronto; president, Joseph Russell, M.P.P., Toronto; first vice-president, T. E. Milburn, Toronto; second vice-president, W. M. Coats, Vancouver, B.C.; representatives on National Live Stock Record Board; Joseph Russell, M.P.P., T. E. Milburn, and Peter Herd, Toronto; secretary, J. E. Dowling, Toronto.

LIVE STOCK ASSOCIATIONS

ONTARIO HORSE BREEDERS' ASSOCIATION

Officers elected: president, Wm. Smith, M.P.; vice-president, John A. Boag; secretary, R. W. Wade, Toronto.

CANADIAN TROTTING ASSOCIATION

At the annual meeting of the Canadian Trotting Association, the secretary-treasurer reported a balance of \$561.36 on hand. A committee was appointed to endeavour to bring the Western Fairs Association under the rules of the Canadian Trotting Association. The officers elected were: President, O. B. Sheppard, Toronto; vice-president, Geo. McCaul, St. Thomas, Ont.; secretary-treasurer, W. A. McCullough, Toronto.

ONTARIO CATTLE BREEDERS' ASSOCIATION

At the annual meeting of the Dominion Cattle Breeders' Association, it was decided that the organization should henceforth be known as the Ontario Cattle Breeders' Association. A resolution was passed appointing a committee to interview the Provincial Minister of Agriculture

with a view to securing the elimination of the scrub bull. John Gardhouse was elected president and R. W. Wade, secretary.

ONTARIO SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Ontario Sheep Breeders' Association, the question of amended legislation regarding the higher taxation of dogs was left to the executive to deal with. The officers elected were: President, Jas. Douglas, Caledonia; vice-president, J. D. Brien, Ridgetown; secretary-treasurer, R. W. Wade, Toronto.

ONTARIO SWINE BREEDERS' ASSOCIATION

Officers elected: President, John Flatt, Hamilton; first vice-president, Wm. Jones, Mount Elgin; secretary, R.W. Wade, Toronto.

ONTARIO BERKSHIRE SOCIETY

Officers elected: President, Frank Tisdale; first vice-president, H. A. Dolson; secretary, R. W. Wade, Toronto.

ONTARIO YORKSHIRE CLUB

Officers elected: President, J. C. Stuart, Osgoode Station; vice-president, R. Garbutt, Belleville; secretary-treasurer, R. W. Wade, Toronto.

EASTERN LIVE STOCK UNION

In Toronto on February 8th, the organization of the Eastern Live Stock Union was completed with the election of the following officers: President, Wm. Smith, M.P., Columbus, Ont.; first vice-president, John Gardhouse, Weston, Ont.; second vice-president, R. R. Ness, Howick, Que.; third vice-president, W. R. Reek, Fredericton, N.B.; secretary-treasurer, R. W. Wade, Toronto.

CANADIAN BEE-KEEPER'S ASSOCIATION

Officers elected: President, R. A. Fletcher, first vice-president, Geo. Morrison; second vice-president, J. K. Martin; secretary, P. Temple; assistant secretary, C. V. Clubb.

SEED SUPPLIED BY THE CANADIAN SEED GROWERS' ASSOCIATION

Following is an approximate estimate of the quantity of registered seed catalogued for sale by members of the Canadian Seed Growers' Association in the six years ending with 1916:—

1911.....	16,631
1912.....	16,373
1913.....	66,008
1914.....	40,963
1915.....	78,304
1916.....	59,217

Not only were many thousand bushels of seed distributed which were not advertised in the catalogues, but large quantities of seed grown from registered and improved seed have been disseminated in many districts. As an instance of this, it might be mentioned that a large percentage of white oats now grown in Prince Edward Island originated with members of the association.

CANADIAN CO-OPERATIVE WOOL GROWERS' LIMITED

A conference of wool growers from every province in Canada, which, with its committee and formation meetings covered three days, namely, February 5, 6, and 7, was held in the Dominion Government wool warehouse, Toronto, and the Canadian Co-Operative Wool Growers Limited, organized. Following a prolonged discussion presided over by Mr. F. N. Savoie, of Quebec, and during which Mr. T. R. Arkell, chief of the Sheep and Goat Division, Ottawa, and in charge of the wool warehouse, made full statements regarding the sales of last year and relative to the existing situation (see THE AGRICULTURAL GAZETTE, Vol. IV, pages 23, 265, 313, 864 to 873, and Vol. V, page 141), it was decided to form the association on a co-operative basis with a capital of \$200,000 divided into 20,000 shares of \$10 each.

THE BY-LAWS

An appointed committee submitted a draft of by-laws which was considered by the conference and ultimately adopted to provide: That subscriptions for stock can be taken from any eligible person; that the minimum subscription shall be one share, on which 20 per cent shall be paid on allotment; that no call shall exceed 20 per cent and that three months shall elapse between calls; that shares can be summarily forfeited on which a call remains unpaid for six months; that the directors can refuse applications for stock and must sanction transfers; that the head office shall be in Toronto; that each province having one or more shareholders shall be entitled to delegates at annual or special general meetings, but that such delegates shall not exceed 30 in number, the directors to give notice when calling the meeting of the number of delegates each province is entitled to; that transportation of delegates shall be paid and \$5 a day allowed as living expenses when actually employed in the service of the company; that meetings shall be held in each province for the election of delegates; that the annual meeting shall be held in Toronto in January or February according to the decision of the directors; that special general meetings shall be held whenever the directors consider desirable, or on petition to the president of 10 per cent of the shareholders; that 45 days' notice of meetings shall be given; that ten delegate shareholders shall constitute a quorum; that a shareholder shall have but one vote; that shares cannot be jointly owned; that the board shall consist of 15 directors, each province having at least one director, and no province more than three directors; that every shareholder having one share shall be eligible to the directorate; that the board shall choose their own officers; that five directors shall be a quorum; that meetings of the board can be held on five days'

notice; that the president may decide the place of meeting of the board; that a commission of investigation may be appointed by the delegate shareholders at any special or general meeting; that the directors can borrow money on the credit of the company or issue bonds or debentures for no less sum than \$100; that the directors can pay a commission of 5 per cent for the sale of shares; that business shall be conducted so as to provide 6 per cent payment on the paid up capital and to provide a reserve fund not exceeding 1 per cent on the year's sales. Other by-laws refer to the duties of the officers.

RESOLUTIONS

Resolutions were passed by the conference offering the wool output to the Government at last year's price if required for war purposes; instructing the directors to advise the authorities in Australia and New Zealand that Canadian wool was not shipped to the United States for gain, but because 75 per cent of it could not profitably be used in Canada; expressing appreciation of assistance given by the Live Stock Branch of the Federal Department of Agriculture in the grading and marketing of wool and praying that such assistance be continued. It was decided to ask the Dominion Government to appoint a commission of three to take charge of the wool growers' interests, the commission to be composed of the president of the Canadian Co-operative Wool Growers' Limited, and one each from the East and the West to be recommended by the directors of the Association.

THE DIRECTORATE

Following are the names of the first directorate appointed under the by-laws of the Association:

British Columbia: George C. Haynes, Kamloops, B.C.; Alberta: J. W. Renton, Calgary; Levi Harker, Magrath; Saskatchewan: J. H. Follett, Duval; J. D. Wilson, Maple Creek; Manitoba: George Gordon, Oak Lake; Ontario: Col. Robert McEwen, London; W. A. Dryden, Brooklin; Geo. L. Telfer, Paris; Quebec: T. A. McClary, Lennoxville; J. R. McDowell, Shawville; M. St. Marie, Hoe's River; New Brunswick: Angus M. Avard, Sackville; Nova Scotia: Stanley Logan, Amherst; Prince Edward Island: Wm. McGregor, Central Lot 16.

On the close of the conference the directors met and elected Lieut.-Col. Robert McEwen, London, Ont., president; Captain J. D. Wilson, Maple Creek, Sask., first vice-president; Stanley Logan, Amherst, N.S., second vice-president, and F. E. O'Brien, Toronto, secretary. By consent of the Dominion Minister of Agriculture, Mr. T. Reg. Arkell, Chief of the Sheep and Goat Division, will give his services as manager of the association for the first year.

NOVA SCOTIA FARMERS' ASSOCIATION

The annual meeting of the Nova Scotia Farmers' Association was held at Truro on January 22 to 24. Addresses were delivered on stallion enrolment, spraying, the fertilizer situation, greater production, the protection of sheep against dogs, and other topics. Resolutions were adopted urging more stringent legislation with respect to dogs; legislation requiring potatoes to be graded similar to the United States law; urging the provincial Government to increase the annual grant to \$20,000; opposing the adoption of the daylight-saving scheme as recommended for cities and towns; favouring the nationalization of the railroads of Canada; that The Agricultural Act of the province be so amended as to deprive agricultural societies of their share of the grant as a penalty for changing from one breed to another without con-

sulting the Department of Agriculture; that the Food Controller be memorialized to prohibit mills from withholding available mill feeds; that the Highway Board appoint efficient patrol men to effect minor repairs as required; that the federal Government be asked to give cars of feed precedence over all other freight except munitions and other war materials; that the Nova Scotia Farmers' Association accept representatives from co-operative associations on the basis of one representative for one hundred members or less and one representative for membership over that number. The following officers were elected: President, Samuel Freeman, Amherst; 1st vice-president, D. R. Nicholson, Coxheath; 2nd vice-president, Walter Churchill, Yarmouth; secretary, C. R. B. Bryan, Truro.

THE HOLSTEIN RECORD

The Holstein cow, Zarilda Clothilde 3rd DeKol, owned by Colony Farm, the property of the Government of British Columbia, has completed an official world's record for milk and butter produced in one year. She commenced her record at

six years, ten months, and twelve days of age, and at the completion of the year was giving about forty pounds of milk per day. Following is her record as supplied by Mr. W. A. Clemons, Secretary of the Holstein-Friesian Association of Canada:—



COLONY FARM CHAMPION HOLSTEIN, ZARILDA CLOTHILDE 3RD DE KOL

Days	Milk lb.	Butter lb.	Days	Milk lb.	Butter lb.
7	831.3	31.12	180	18572.4	638.48
30	3331.7	122.25	210	21031.2	725.32
60	6718.0	233.96	240	23260.0	806.11
90	9940.5	338.62	270	25292.7	878.43
120	13009.8	442.28	300	27277.7	950.28
150	15900.7	544.58	330	28902.9	1010.42
			365	30467.0	1071.34

ONTARIO CORN GROWERS' ASSOCIATION—STANDARDS FOR CORN

THE Ontario Corn Growers' Association on the recommendation of the committee selected for the purpose has adopted the following standards for varieties of corn suitable for cultivation. for ensilage and seed corn purposes, in the province of Ontario:

DENTS

Wisconsin No. 7

Ear—Length, $8\frac{1}{2}$ inches to $9\frac{1}{2}$ inches. Circumference, 7 inches to $7\frac{1}{2}$ inches.

Kernel—Colour, creamy white. Indentation, well dented. Rows, 16-20.

Butt—Moderately rounded.

Tip—Well covered. Fairly full.

Cob—Colour, glistening white.

Bailey

Ear—Length, $7\frac{3}{4}$ inches to $8\frac{1}{2}$ inches. Circumference, $6\frac{3}{4}$ inches to $7\frac{1}{4}$ inches.

Kernel—Colour, yellow cap with reddish tinge lower. Indentation, nicely dented.

Rows—16-18.

Butt—Moderately rounded.

Tip—Full, well covered.

Cob—Colour, dark red.

White Cap Yellow Dent

Ear—Length, $7\frac{3}{4}$ inches to $8\frac{1}{2}$ inches. Circumference, $6\frac{3}{4}$ inches to $6\frac{7}{8}$ inches.

Kernel—Colour, cap white, remainder yellow. Indentation, fairly rough.

Rows—14-16.

Butt—Moderately rounded.

Tip—Well covered, slightly tapering.

Cob—Colour, red or white.

Golden Glow

Ear—Length, $8\frac{1}{4}$ inches to $9\frac{1}{4}$ inches. Circumference, $6\frac{1}{2}$ inches to 7 inches.

Kernel—Colour, deep yellow. Indentation, medium.

Rows—16-18.

Butt—Moderately rounded.

Tip—Slightly tapering.

Cob—Colour, cherry red.

FLINTS

Longfellow

Ear—Length, $10\frac{1}{2}$ inches to $11\frac{1}{2}$ inches. Circumference, $4\frac{1}{2}$ inches to 5 inches.

Kernel—Colour, deep golden yellow. Indentation, none.

Rows—Eight.

Butt—No larger than $\frac{1}{2}$ distance up ear.

Tip—Slightly tapering and well covered.

Cob—Colour, pure white.

Salzer's North Dakota

Ear—Length, $10\frac{1}{2}$ inches to $11\frac{1}{2}$ inches. Circumference, 5 inches to $5\frac{1}{2}$ inches.

Kernel—Colour, pearly white. Indentation, none.

Rows—Eight.

Butt—No larger than one-third distance up ear.

Tip—Slightly tapering and well covered.

Cob—Colour, pure white.

Compton's Early

Ear—Length, 12 inches to 13 inches. Circumference, $5\frac{1}{2}$ inches to 6 inches.

Kernel—Colour, deep golden yellow. Indentation none.

Rows—Twelve.

Butt—No larger than one-third distance up ear.

Tip—Well covered.

Cob—Colour, pure white.

After holding a successful three days' show, viz., on February 12, 13 and 14, at Chatham, Ont., the Ontario Corn Growers' Association elected the following officers: President, L. L. Gregory, Kent Bridge; first vice-president, Walter Anderson, Amherstburg; second vice-president, Stuart Macdonald, Port Lambton; treasurer, J. H. Coatsworth, Kingsville; secretary, P. L. Fancher, Chatham.

CENTRAL CANADA VETERINARY ASSOCIATION

The annual meeting of the Central Canada Veterinary Association was held in Ottawa on February 7th. The following officers were elected: Honorary president, Dr. F. Torrance, Veterinary Director

General; president, Dr. Geo. Hilton, Chief Veterinary Inspector, Department of Agriculture, Ottawa; secretary-treasurer, Dr. A. B. Wickware, Ottawa.

ONTARIO MILK AND CREAM PRODUCERS' ASSOCIATION

An organization known as the Ontario Milk and Cream Producers' Association has been formed with the following officers: President, E. H. Stonehouse, Weston, Ont.; secretary-treasurer, Manning W. Doherty, Malton, Ont.; executive committee, G. J. Cook, Beachville, Ont.; P. J. Griffin, Freeman, Ont.; H. D. Rice, Welland, Ont.;

S. Young, Guelph, Ont.; J. B. Long, Hintonburg, Ont.; T. Shearer, Listowel, Ont.; Andrew Cornish, Wilton Grove, Ont.

The objects of the association are to improve conditions under which milk is produced, to improve marketing methods and to standardize milk and cream as sold as such.

THE ONTARIO PLOUGHMEN'S ASSOCIATION

At its annual meeting held in Toronto on February 4th, the Ontario Ploughmen's Association decided that this year's provincial ploughing match should be held at Ottawa on October 16, 17 and 18. The officers elected were: President, W. C.

Barrie, Galt; first vice-president, W. H. Garbutt; treasurer, T. A. Patterson, Agincourt; directors, R. B. Faith, W. R. Grey and T. H. Lennox, all of Ottawa; secretary and managing director, J. Lockie Wilson, Toronto.

THE MONTH'S MEETINGS

March

- 5-9—Manitoba Winter Fair, Brandon.
 5 — “ Annual Bull Sale “
 7 — “ Sale of Sows “in pig” “
 13—Spring Cattle Sale, Regina, Sask.
 14—Spring Horse Sale, “ “

March

- 26-29—Spring Horse Show and Bull Sale,
 Calgary, Alta.

April

- 2-6—Spring Horse Show, Edmonton, Alta

THE MANITOBA DAIRY ASSOCIATION

The 32nd annual convention of the Manitoba Dairy Association was held at Winnipeg, January 31st and February 1st. The Interprovincial Butter Show was held at the same time. The convention was especially largely attended and the butter exhibits attracted a great deal of attention. A noteworthy feature was the attendance of many visitors from other provinces.

Mr. Geo. H. Barr, Chief of the Dairy Division of the Dairy and Cold Storage Branch, Ottawa, gave an address on the keeping of herd records. Regarding the butter industry throughout Canada, he said that the quantity made in 1917 compared with that made in 1916, is as follows: Ontario about 5 per cent less, New Brunswick 13 per cent less, Saskatchewan 2 per cent less, Prince Edward and British Columbia about the same quantity, while Manitoba and Nova Scotia show an increase of 13 per cent.

“The Grading of Cream for Butter Making”, was dealt with by Mr. C. Marker, Dairy Commissioner for Alberta. The pasteurization of cream was advocated by several creamery representatives and a resolution was passed recommending that grade certificates be issued on butter made from properly pasteurized cream only, and that a special score card be issued to the creameries on butter made from raw or improperly pasteurized cream, the card to state that the score does not indicate the quality of the butter beyond date of manufacture.

Another resolution endorsed the policy advocated by Mr. Geo. H. Barr, relative to the keeping of herd records and cow testing, and further recommending aggressive action in this direction.

A DOMINION-WIDE ASSOCIATION

A third resolution was one favouring a

Dominion-wide dairy association, and, at the close of the convention, a meeting of representatives of dairy industries from the three prairie provinces was held, and a resolution unanimously adopted to appoint two members from each of the provinces and from British Columbia, to state the objects and to draft by-laws and a constitution for an organization consolidating Canadian dairy interests, such by-laws and constitution to conform with the ideas of the dairy commissioners and associations in Eastern and Western Canada. The appointees made at this meeting in accordance with the resolution were as follows:

Manitoba: L. A. Gibson, dairy Commissioner; A. McKay, J. Carruthers, Winnipeg.

Saskatchewan: F. M. Logan, Dairy Commissioner; W. A. Wilson, Regina; O. W. Andreason, Humboldt.

Alberta: C. Marker, Dairy Commissioner; J. B. Thompson, Edmonton; J. W. Carlyle, Calgary.

A permanent secretary is to be appointed who will be able to devote all his time and energy towards the organization of the new association. The above-mentioned delegates will ask for the appointment of similar delegates from the eastern provinces. A conference will next be held and the new organization, it is expected, be brought into being.

THE OFFICERS

The following officers of the Manitoba Dairy Association were elected: President, Alex. McKay, Winnipeg; first vice-president, S. Code, Dauphin; second vice-president, C. Tully, Reaburn; secretary, L. A. Gibson, Provincial Dairy Commissioner, Winnipeg.

SASKATCHEWAN AGRICULTURAL SOCIETIES

The annual convention of the Agricultural Societies of Saskatchewan was held at Saskatoon on January 8th to 12th. During the year three new societies were organized, bringing the total up to 121. The societies held 13 spring stallion shows, 50 ploughing matches, 2 good farm competitions, 133 exhibitions, 23 standing crop

competitions, 52 seed fairs, 17 poultry shows, 60 short courses. The total membership for the province amounts to 17,934. The minimum age for members has been reduced from 18 years to 12 years. Mr. E. S. Greenway, B.S.A., was appointed Director.

SASKATCHEWAN POULTRY BREEDERS' ASSOCIATION

At a meeting of poultry breeders of Saskatchewan, held at Moose Jaw on February 8th, to reorganize the Saskatchewan Poultry Breeders' Association, an entirely new constitution was adopted, giving voting power on certain questions to individual representatives from each affiliated association. A resolution was passed asking the Minister of Agriculture for the province to call a meeting of representatives of every association, with a view of bringing together the two factions that at present exist. Resolutions were also passed asking the Provincial Government to purchase

2000 coops with drinking cups to be placed at the disposal of poultry shows; asking the Department of Agriculture to inaugurate an egg-laying contest; asking the Provincial Government to induce the Department of Education to include a course of study in poultry breeding in the curriculum of both normal and public schools; requesting the Provincial Government to make grants to the different poultry associations to be distributed in prizes at poultry exhibitions, and deciding to petition for the placing of incubators and poultry equipment on the customs free list

UNITED FARM WOMEN OF ALBERTA

At the annual conference of the United Farm Women of Alberta held in Calgary from January 22nd to 25th, Miss Jean Reid, Alix, Alta., was elected honorary

president; Mrs. Walter Parlbay, Alix, president; Mrs. J. H. Ross, Duhamel, vice-president; Mrs. Leona Barrett, Calgary, secretary.

ALBERTA PROVINCIAL POULTRY ASSOCIATION

The annual meeting of the Alberta Provincial Poultry Association was held at Calgary on December 12th. After debating the question of moving the Provincial Poultry Show from time to time, it was decided that it should be held at Calgary during the next five years. It

was decided to publish a directory of poultry breeders in the province. The following officers were elected: President, C. M. Baker, Calgary; first vice-president, A. E. Humphrey, Lethbridge; second vice-president, W. A. Moore, Medicine Hat; secretary-treasurer, P. J. Timms, Calgary.

PRINCE EDWARD ISLAND EGG AND POULTRY ASSOCIATION

THE reports presented at the fourth annual meeting of the Prince Edward Island Egg and Poultry Association held at Charlottetown, January 13, 14 and 15, proved exceptionally satisfactory. The receipts for 1917, according to the report of the secretary, totalled 939,654 dozens, exceeding those of 1916 by 127,059 dozens. The average price per dozen last year was 7.21 cents higher than in 1916. The average price per dozen in 1916 was \$25.35 and \$32.56 in 1917. The association shows a net gain in membership of 329. A new act of incorporation went into force during the year. All circles are now corporate bodies and all the members are registered under the Act. The advantages of the recently introduced system is seen in the fact that while in 1916, 288 members were reported as not in good standing, last year only nine were so reported. The new regulation provides for a capital fund to be distributed annually on a pro rata basis among the members. The first payment on this account was made on December 17th and amounted to \$18,498.32.

A poultry improvement scheme has been adopted and as a result, an importation of funds derived under THE AGRICULTURAL INSTRUCTION ACT. An importation of utility breeding stock is being distributed among the farmers of the Island. The importation was selected from among the best flocks of Eastern Canada. The secretary's report also referred appreciatively to the assistance rendered by the Dominion Live Stock Branch, the Provincial Department of Agriculture, and the federal Experimental Station. Among the resolutions adopted were one appointing a committee to select a shorter name for the association, and another approving the revision of the association's charter in order to add selling and handling seed grains and other farm products to the activities of the association. The following officers were elected: President, Rev. P. P. Arsenault, Mount Carmel; first vice-president, Edward Bulpitt, Cardigan; second vice-president, J. B. Millman, Long River; third vice-president, Albert Schurman, Central Bedeque; secretary-treasurer, W. J. Kerr, B.S.A., Charlottetown.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT
OF AGRICULTURE

The Agricultural Instruction Act. A 36-page bulletin has been published giving in brief summary form details of the uses to which the funds granted under THE AGRICULTURAL INSTRUCTION ACT have been put in the different provinces since the enactment of the measure. The work done under the Agricultural Aid Act, passed in 1912, is briefly referred to. Relative to THE AGRICULTURAL INSTRUCTION ACT, full particulars covering the four years extending from 1913 to 1917, during which \$3,400,000 has been divided between the nine provinces, are specifically set forth. The bulletin opens with a summary of the work designed to be performed under the Act, and from thence proceeds to deal in concise form with the different objects to which the funds have been applied by all the provinces. A cursory view of the bulletin will show that there is not one line of agriculture to which some portion of the funds has not been put.

THE DIVISION OF CHEMISTRY

Fertilizer Economy in War-Time. Special Circular, No. 14, of the Division of Chemistry, is a four-page leaflet bearing the foregoing heading. It contains well put, and tersely put, advice from B. Leslie Emslie, F.C.S., Supervisor of Investigational Work with Fertilizers, on the use, value, and constituents of commercial fertilizers.

THE PROVINCIAL DEPARTMENTS
OF AGRICULTURE

NOVA SCOTIA

Food Production Bulletins.—Three bulletins having for their object the encouragement of increased food products have been issued by the Nova Scotia Department of Agriculture. The first of these bulletins is on "Seed Growing in Nova Scotia" and has for its authors, Professor M. Cumming, Secretary for Agriculture, and Mr. S. J. Moore, Dominion Seed Inspector. The second is on "Bean Growing", and was written by Professor P. J. Shaw, Horticulturist at the College of Agriculture, Truro, and contains an appendix on "Cooking Beans", by Miss Jennie A. Fraser, Superintendent of Women's Institutes for the Province. The third has for its subject, "Greater Labour Efficiency on the Farms of Nova Scotia, by using bigger implements", Professor J. M. Trueman of the Agricultural College being the author. In this bulletin, the announcement is made by the Secretary for Agriculture that his Department will pay 25% of the cost of

two furrow ploughs bought in the Province of Nova Scotia between the present and the first day of May next.

QUEBEC

The Report of the Minister of Agriculture for the year ending June 30th 1917, recently issued, is a plentifully illustrated volume of 228 pages. It contains reports of all the demonstrations and activities of the various branches of the Department for the year.

The Breeders' Guide of the Province of Quebec, 1918, is a 36-page bulletin, printed in both French and English. It contains, besides classified lists of all the breeders in the province with the number of animals owned by each of them, a blank register of mating form, an appeal for greater production, and information on common topics.

Pure Maple Sugar and Syrup.—The proceedings at the 5th annual meeting of the Pure Maple Sugar and Syrup Co-operative Agricultural Association held at Victoriaville, Que., January 23 and 24, 1917, has been issued in book form in both French and English. It contains a full list of the members and gives many interesting details of the industry.

How to Increase the Production of Pork, by Jos. Pasquet, Professor of Zootechny, Ste. Anne's Agricultural School. This is bulletin No. 51 of the Department of Agriculture and is an appeal to farmers to produce more hogs. It points out the reasons for doing so and supplies details in connection with the work.

ONTARIO

Co-operative Wool Sales. An appendix to the annual report of the Live Stock Branch for 1917 of Ontario, gives full statistical reports of co-operative wool sales according to counties. It also contains full descriptions of the requirements in the different breeds of sheep and much information regarding housing and feeding.

MANITOBA

Numbers 20 and 21 of the Extension Bulletins issued in the Manitoba Farmers' Library series by the provincial agricultural college, deals respectively with "Cheese-Making on the Farm" and "Better Farm Houses". The former is by I. Villeneuve, Inspector of Cheese-Making, and the latter by L. J. Smith, B.S., Professor of Agricultural Engineering. Each makes a bulletin of twenty pages and is plentifully illustrated with photo pictures and diagrams.

SASKATCHEWAN

Department of Agriculture.—The 12th annual report for the twelve months ending April 30, 1917, makes a book of 320 pages, and covers all the activities of the Department, with plentiful statistics and portraits of former officers of the department who have made the supreme sacrifice in the war.

MISCELLANEOUS

The Clydesdale Stud Book of Canada, Volume 25, has just been issued covering the registrations of Clydesdale stallions from 17,420 to 18,572, and of mares from 35,690 to 37,743. The minutes of the thirtieth annual meeting, lists of awards at exhibitions, the constitution and rules of entry, and much other relative details are given. A portrait of the late John Bright, Live Stock Commissioner, forms a frontispiece.

High School Boys' and Girls' Work in Food Production in 1917 is the subject of Circular No. 8, of the Organization of Resources Committee for the Province of Ontario. It consists of 20 pages, and, besides an appeal for further effort, and a brief review of last year's work, contains the four essays that won the provincial prizes on "How can the Ontario High School Boy by Working on a Farm this Summer help Himself, the Farmer, the Empire". A list of winners of prizes in every district is given by counties.

Canadian National Live Stock Records. The thirteenth annual report of the Record Committee to the Record Board and Record Associations, with the kindred facts that usually accompany its publication, makes a book of 86 pages. It contains lists of officers of all the affiliated breeders' societies, with the financial statement to December 31st, 1917, of each society. New features are tables of the pure-bred animals owned in each of the three Prairie Provinces showing a marvellous increase in the last six years, and a couple of pages of information regarding the importation and transportation of pure-breds. The customs, quarantine and health of animals regulations for both Canada and the United States are also given.

A little book of 32 pages published by Wm. Briggs, Toronto, under the title of "A Career of Eminent Service in Education and Agriculture", gives a sketch of the life of James Mills, M.A., LL.D., now in his 78th year, and for a quarter of a century President of the Ontario Agricultural College. The Doctor's life is briefly traced from the time when he was the eldest of ten children, and worked on his father's farm in the county of Simcoe, and at the age of twenty lost his right arm in a threshing machine. A year later he entered the local public school and received his first lesson in English grammar.

NOTES

The State of Minnesota has 3,000 farmers' co-operative enterprises, 450 of which are live stock shipping associations.

Mr. F. A. Dixon, M.A., a Nova Scotia school inspector, recommends the formation of pupils' production clubs under such names as corn clubs, canning clubs and pig clubs, such as are operated in parts of Canada and the United States.

Fully fifty per cent of the members of the Boys' and Girls' Club at Dauphin, Man., are foreigners, either by birth or descent. The Secretary is a Ruthenian. A Polish boy brought his pigs sixteen miles to the annual school fair.

In the inspectoral district covering the county of Carleton and parts of Victoria and York, New Brunswick, Arbour Day was observed in 1916 in one hundred and twenty-nine districts. One hundred and fifty-seven trees and sixty-two shrubs and two hundred and forty-four flower beds were planted.

Amos O'Blenes, M.A., School Inspector, Moncton, N.B., in his report to the Superintendent of Education states that all new school sites chosen during 1916 consisted of an acre of land, and that several old sites have been enlarged to this area. The enlarged area is to provide space for school gardens.

Professor M. C. Herner, of the Manitoba Agricultural College, during the latter part of January, conducted a short course on poultry raising before the students of the Saskatchewan Agricultural College at Saskatoon. He also addressed the Saskatoon Poultry Association and set forth a series of rules for back-yard poultry raising.

A Farmers' Co-operative Association has been organized in Dundas county, Ontario, under the direction of Mr. E. P. Bradt, District Representative. The association has adopted the individual note system for securing credit, each member signing a promissory note for twenty-five dollars, which is held at the bank as security.

Mr. W. T. Ritch, an Australian wool specialist engaged by the wool growers of the United States, delivered a series of lectures between February 11th to 18th at various places in Alberta. Three lectures were given on each occasion, the first on "Classification of Wool", the second on "Production of Wool", and the third on "Preparation and Marketing of Wool".

The Dundas district Holstein Breeders' Club have decided to purchase a bull on the co-operative plan. It was estimated at a meeting of the club that the bull would cost between \$10,000 and \$15,000. It was decided that shares should be put at \$100 each, each share entitling a man to breed his cow at a club rate service of \$20. No breeder was to be allowed to breed more than 10 cows. The service fee to non-members was to be \$200. Four members at the meeting offered the club enough to make up more than one-half of the \$15,000. All fees collected will be placed to the credit of the club, and utilized to pay for the bull.

At a gathering of the Welland County Board of Agriculture a resolution was passed appreciating the efforts of the Provincial Department of Agriculture to induce the farmers of Ontario to increase the production of pork, and promising aid to the younger farmers of the county by offering to advance two-thirds of the value of any pure-bred breeding sow that any boy or girl might purchase for the express purpose of breeding, the purchaser to agree to pay to the Treasurer of the Board of Agriculture of the County of Welland on or before January 1st, 1919, the whole of the sum advanced, with 3% interest. The offer was to be open until March 1st.

Mr. J. W. Stark, District Representative for Peel county, reports that in connection with the "Keep a Pig" contest, that he started in the Peel rural schools, seventy-five extra sows have been promised. Regarding the short course, which was held from January 8th to February 1st at Ebenezer, Mr. Stark writes: "In my experience with short course students, I have yet to meet or to hear of a young man who was sorry he took four weeks off to be a member of the agricultural class, but I have had dozens of men come to me and say, 'I would give almost anything to have known beforehand how much that course would have really done for me, and to have again that opportunity to attend that I let slip by.'"

Mr. R. H. Clemens, District Representative for Wellington county, put a couple of readers in the local papers at Arthur, where he has his headquarters, and from them twenty-seven young farmers between the ages of 15 and 23 were induced to give in their entries for the short course conducted by Mr. Clemens. There are 13 local papers in Wellington county, and a reader is sent to each of these newspapers every week. These deal as nearly as possible with current agricultural matters. For instance, says, Mr. Clemens, "When the hog campaign was going strong, we wrote on the production of more pork. When school fairs were being conducted, we wrote articles on school fairs." In short, he tried to make the contributions seasonable.

The Port Arthur Garden Club by its vacant lot activities last year raised products to the value of \$26,527.50. These included 6,600 bags of potatoes sold at \$1.50 a bag; 1,100 bags turnips at \$1.00 a bag; 1,100 bags of carrots at \$1.50 a bag; 1,500 bags of beets at \$1.50 a bag; 49,500 pounds of cabbage at 3c. a lb.; 5,400 lbs. onions at 5c. a lb.; 1,100 bushels of peas at \$1.50 a bushel; 550 bushels of beans at \$2.00 a bushel; 5,500 cucumbers at 3c. each; 11,000 heads of cauliflower at 10c. a head; 27,500 bunches of celery at 5c. a bunch; 11,000 bunches of parsley at 5c. a bunch; 550 bushels of tomatoes at \$1.25 a bushel; 5,000 doz. bunches of lettuce at 30c. a dozen; 250 marrows at 20c. a piece; 200 squash at 20c. a piece; 3,000 doz. bunches of radishes at 30c. a dozen.

A table in the report of the board of the Canadian National Live Stock Records for the year 1917 furnishes statistics of the number of pure-bred animals in the three Prairie Provinces at the end of 1916. It also gives the totals of each breed in 1911, in which year there were 13,074 pure bred horses against 25,213 in 1916; 25,876 cattle compared with 49,115 in 1916; 3,290 sheep, compared with 11,396 in 1916, and 13,006 swine against 32,043 in the latter year. Clydesdales show an increase in the five years of 6,851 and Percherons of 2,003. In cattle, Aberdeen Angus show an increase of 1,881; Ayrshires of 1,109; Herefords of 3,611; Holsteins of 4,358; Jerseys of 555, and Shorthorns of 10,473. In sheep, Lincolls show an increase of 630; Oxfords of 2,153; and Shropshires of 2,445. In swine, Duroc Jerseys show an increase from 257 in 1911 to 7,068 in 1916; Berkshires from 4,684 to 13,152; Poland China from 453 to 2,135, and Tamworth from 568 to 1,163. Yorkshires were nearly stationary, totalling 6,140 in 1911 and 6,406 in 1916.

INDEX TO PERIODICAL LITERATURE

- The Canadian Countryman*, Toronto, Jan. 26, 1918.
- The Good Layer is Usually a Hustler, Professor W. R. Graham, Poultry Department, Ontario Agricultural College, Guelph, page 100.
- Feb. 2—Possibilities for Canadian Sheep Raising—Greatest Increase from Flocks on Mixed Farms, T. Reg. Arkell, Chief, Sheep and Goat Division, Ottawa, page 130.
- Can Pear Blight be Controlled? L. Caesar, Ontario Provincial Entomologist, page 131.
- Succulent Feeds for Beef and Dairy Cattle, E. S. Archibald, Dominion Animal Husbandman, Ottawa, page 132.
- Feb. 9—Capital—What it Means in Co-operation, F. C. Hart, Director, Co-operation and Markets Branch, Toronto, page 163.
- The Agricultural Journal*, Victoria, B.C., January, 1918.
- Increased Production of Hogs for 1918 G. H. Hutton, president, Canadian Swine Breeders' Association, page 218.
- A Means Whereby Depleted Soil may be Brought into a High State of Cultivation, G. E. Parham, Superintendent, Experimental Station, Invermere, B.C. page 220.
- Electrification of Milk, Electrified Milk will Preserve Human Life, T. A. F. Wiancko, Provincial Dairy Instructor, page 223.
- The Canadian Thresherman & Farmer*, Winnipeg, Man., Jan., 1918.
- Modern House Plan, Professor L. J. Smith, Department of Agricultural Engineering, Manitoba Agricultural College, Winnipeg, Plan "E", page 31.
- Farm & Ranch Review*, Calgary, Alta., Jan. 21, 1918.
- Sheep in Alberta in 1917, Jas. McCaig, Department of Agriculture, Edmonton, page 55.
- Feb. 5—Farm Flocks in War Time, M. C. Herner, Professor of Poultry Husbandry, Manitoba Agricultural College, page 135.
- Farm & Dairy and Rural Home*, Peterboro, Ont., Jan. 24, 1918.
- Some Practical Suggestions on the Production of Spring Wheat—Selection of Seed and Dates of Seeding, by Dr. C. A. Zavitz at the Experimental Union Convention, page 61.
- Suggestions on the Production of Butter and Cheese in 1918, H. H. Dean, Ontario Agricultural College, Guelph, page 59.
- Jan. 31—Making the Most of the Labour at Hand, J. H. Grisdale, Director, Dominion Experimental Farms, page 81.
- Feb. 7—War Time Poultry Problems, Professor W. R. Graham, Ontario Agricultural College, page 102.
- Grain Growers' Guide*, Winnipeg, Man., Jan. 23, 1918.
- Live Stock Trade in 1917, D. M. Johnson, Representative of the Dominion Department of Agriculture in the Union Stockyards, Winnipeg, page 9.
- The Farm Shelter Belt, Norman M. Ross, Chief of Tree Planting Division, Indian Head, Sask., page 237.
- The Maritime Farmer*, Sussex, N.B., Jan. 22, 1918.
- Common Ailments & Diseases of Dairy Cattle, F. Torrance, Veterinary Director General, page 221.
- Feb. 5—Apple Spraying, G. E. Sanders, Field Officer in charge Dominion Entomological Laboratory, Annapolis Royal, N.S., page 249.
- The Monetary Times*, Toronto, Feb. 8, 1918.
- How Canada will take Production Census, R. H. Coats, Dominion Statistician and Controller of Census, page 5.
- Nor-West Farmer*, Winnipeg, Man., Feb. 5, 1918.
- Why a Price Cannot be Fixed for Hogs, W. F. Stevens, Live Stock Commissioner for Alberta, page 144.
- Farmers' Advocate*, Winnipeg, Man., Feb. 6, 1918.
- Work Done and Work to Do, L. A. Gibson, Dairy Commissioner for Manitoba, page 185.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

791—Studies on the Digestibility of some Vegetable and Animal Fats.—LANG-WORTHY, C. F., and HOLMES, A. D., in *United States Department of Agriculture, Bulletins* Nos. 505 and 507, each 19 pp. Washington, D.C., Feb. 13 and March 24, 1917.

In these experiments the trials of vegetable and animal fats were conducted with the same methods, so that the results are directly comparable. A basal ration (supplying a minimum of fat) composed

of wheat biscuits, oranges, sugar, and tea or coffee, was supplemented by a blanc mange or corn starch pudding, in which were incorporated the fats under investigation.

As regards the vegetable fats, the authors conclude that olive, cottonseed, peanut, cocoanut, and sesame oils are very completely and readily available to the body, and may be satisfactorily used for food purposes. The animal fats investigated were also well assimilated, and shown to be satisfactory sources of food, butter fat being particularly valuable.

CROPS AND CULTIVATION

795—The Influence of Soil Conditions on the Decomposition of Organic Matter in the Soil.—RUSSELL, E. J., and APPLE-YARD, A. (Rothamsted Experimental Station), in *The Journal of Agricultural Science*, Vol. VIII., Part 3, pp. 385-417. Cambridge, June, 1917.

796—Irrigation in Various States and Colonies.—BORGHESANI, G. A. R., *Commissione Reale per studi e proposte relative ad opere d'irrigazione, seconda Relazione presentata al Parlamento del Presidente Onorevole Girolamo Giusso, Senatore*, Part 3, pp. I-VII. Bergamo, 1916. (2 pp. in Institute Bulletin.)

This monograph is a study on irrigation in various countries, especially in arid and semi-arid districts.

In conclusion, the following principles for

the irrigation of arid zones in general are given:—

1. The utilization of superficial, sub-soil, and deep waters by all the means in the power of modern technology.

2. Technical State assistance in the utilization of the various water reserves suitable for irrigation.

3. Financial State aid for irrigation work if private capital cannot find immediate interest.

4. An appropriate distribution of the reserve waters suitable for domestic, agricultural and industrial uses, so that its use for the last purpose shall not be detrimental to the other two more important ones.

5. Technical assistance given to those engaged in irrigation farming, so that they may make the most economical use of the water at their disposal.

6. The institution of homesteads for those engaged in irrigation farming, as this is the only method which will allow the maximum economical utilization of the water.

7. The recognition, with the requisite support, of all irrigation works and enterprises which have been declared by competent technical bodies to be of public utility.

An appendix gives a bibliography of 643 works.

797—The Fixation of Nitrogen in Faeces.—RICHARDS, E. H., (Rothamsted Experimental Station), in *The Journal of Agricultural Science*, Vol. VIII, Part 3, pp. 299-311. Cambridge, June, 1917.

799—The Solubility of Calcium Phosphates in Citric Acid.—RAMSAY, A. A. (Chemical Laboratory, Department of Agriculture, Sydney, N.S.W.), in *The Journal of Agricultural Science*, Vol. VIII, Part 3, pp. 277-298. Cambridge, June, 1917.

800—The Resistance of Wheat to Cold in Relation to its Sugar Content; Investigation carried out in Sweden.—AKERMAN A., and JOHANSSON, H., in *Sveriges Ustadeforenings Tidskrift*, Year 27, Pt. 2, pp. 77-83. Malmö, 1917. (2 pp. in Institute Bulletin.)

During the last 10 years it has been proved that the resistance of plants to low temperatures is due, in part at least, to the presence of sugars (saccharose, glucose, mannite, etc.) in the cell sap. With regard to the Gramineae, GASSNER and GRIMMER have observed that the water extract of autumn cereal seedlings gives a much stronger reaction with Fehling's solution than the water extract of spring cereals treated with the same reagent.

The experiments described were undertaken to determine whether the various degrees of resistance to cold of the principal Swedish wheats really are due to a more or less strong concentration of the sugars in solution. Three series of experiments were made, of which the analytical results are given in the article in the Institute Bulletin.

801—Temperature and Life Duration of Seeds; Experiments made in the United States.—GROVES, JAMES FREDERICK (Contribution from the Hull Botanical Laboratory 226), in *The Botanical Gazette*, Volume LXIII, No. 3, pp. 169-189. Chicago, Illinois, March, 1917. (2 pp. in Institute Bulletin.)

In the appendix there is a bibliography giving 33 publications mentioned in the text of the article.

A study of the effect of high temperatures (from 50° to 100° C.) upon the life duration of seeds of wheat (Turkey-red

variety) with a somewhat low moisture content (9%—12%—17.5%).

802—The Influence of Light on the Germination of the Seeds of the Different Varieties of *Nicotiana Tabacum*.—HONING, J. A., in *Bulletin van het Deli Proefstation*, No. 7, pp. 1-14. Medan, December, 1916.

803—The Influence of Mineral Matter on the Germination of Peas.—MAQUENNE, L., and DEMOUSSY, E., in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 2, pp. 45-51. Paris, July 9, 1917. (2 pp. in Institute Bulletin.)

805—The Fertilization of Gramineae and Leguminosae in Relation to Selection.—FRANDSEN, N. H., in *Zeitschrift für Pflanzenzüchtung*, Vol. V., Pt. 1, pp. 1-30. Berlin, March, 1917. (2 pp. in Institute Bulletin.)

806—Selection of Spring Wheat in Sweden.—NILSSON-EHLE, H., in *Sveriges Ustadeforenings Tidskrift*, Year 28, Pt. 2, pp. 51-76. Malmö, 1917. (3 pp. in Institute Bulletin.)

Until recent years it was thought that there existed a negative correlation between earliness and yield, the one diminishing as the other increased. Results obtained lately with winter wheats show that these two characters develop, and are transmitted, independently of each other, at least up to a certain point.

In the northern climates, especially in Scandinavia, it is important to have wheats which combine the two characters, "earliness" and "productivity." The selection and hybridization experiments carried out at the Svalof Station (Sweden) and at its branches, aimed at creating types of spring wheat which should be both very early and very productive. In the article in the Institute Bulletin, the results of experiments from 1911 to 1917 are given. One variety, "Svalofs Extra Kolben," has been found highly valuable from every point of view.

807—Hybridization Tests between Spelt and Wheat in Holland.—GMELIN, H. MAYER, in *Cultura*, Year 29, No. 345, pp. 140-158. Wageningen, May, 1917. (3 pp. in Institute Bulletin.)

808—Experiments in Hybridizing Wheat and Rye in the United States.—I. LEIGHTY, C. E., Carman's Wheat-Rye Hybrids, in *The Journal of Heredity*, Vol. VII, No. 9, pp. 420-427. Washington, September, 1916.—II. MCFADDEN, EDGAR A., Wheat-Rye Hybrids, *Ibid.*, Vol. VIII, No. 7, pp. 335-336. Washington, July, 1917. (2 pp. in Institute Bulletin.)

810—Experiments with Small Grains (Wheat, Barley, and Oats) Under Irrig-

gation in Idaho, United States.—WELCH, J. S., in *University of Idaho Agricultural Experiment Station, Gooding Sub-Station, Bulletin* 93, 24 pp. Moscow, Idaho, January, 1917.

In 1909, the Office of Irrigation Investigations of the United States Department of Agriculture and the Idaho Experiment Station established the Gooding Sub-Station for experimental work in the irrigation of farm crops. The Station is a tract of 40 acres located 2 miles south of the town of Gooding on the great Snake river plains at an elevation of approximately 3,600 feet. The Bulletin analysed is based upon the results of experiments conducted at this Station during the years 1909 to 1916 inclusive. The writer gives the following summary:—

The small grain crops are of great importance on the irrigated farms of Idaho.

Wheat.—Of all the spring varieties, the soft white ones are best adapted for growth under irrigation. Dicklow is the leading variety grown under irrigation at this time. For average irrigation conditions, the durum wheats are not recommended.

In the irrigation of spring wheat, water can be used most efficiently in the early stages of the plants' development. If but one irrigation can be given, it should be applied just before the first jointing stage of growth. If water is withheld till the grain reaches the soft dough stage, it is of no value to the crop. The most satisfactory results were obtained at the Gooding Sub-Station by the application of one irrigation just before the first jointing stage and another between the first jointing and the blooming stage. In the growth of spring wheat, it is not advisable to apply a total of more than one and one-fourth acre-feet of water per acre.

Winter wheats can be grown to advantage on irrigated lands; perhaps to best advantage in those sections where irrigation water is not plentiful. On the station farm the best varieties have proved to be "Jones Fife" and "Turkey Red." In the irrigation of winter wheat, one irrigation of slightly less than three-fourths of an acre-foot of water per acre, given just before heading was found to be sufficient.

Barley. Of the six-rowed type Trebi, Beldi, and Sandrel were the varieties which gave the highest crops under irrigation. The best varieties of the two-rowed type were "Bohemian" and "Horn." Eureka was the best of the hullless type.

For irrigating spring barleys, about 1½ acre-feet of water should be applied per acre. Under normal irrigation winter varieties of barley are not nearly as productive as the spring-sown ones. Winter barley should be irrigated just before the appearance of the ears, and only about ½ acre-foot of water applied per acre.

Oats.—A large number of the varieties of oats are very productive. The best from this point of view are Swedish Select, with 96.6 bushels of grain per acre and 1.63 tons of straw per acre, and Wisconsin Pedigree No. 1, with 96.5 bushels of grain and 1.69 tons of straw per acre. Oats do not require more than 1¼ acre-feet of water per acre.

Tables are given in the article in the Institute Bulletin showing the performance records of irrigated wheats and barleys.

812—Shallu, a Variety of Sorghum, in the Great Plains, United States.—ROTHGEB, BENTON E., in *Farmer's Bulletin* 827, United States Department of Agriculture, 8 pp., 5 fig. Washington, D.C., June 1917.

813—Experiments with Irrigated Legume Crops and Grass Pastures.—WELCH, J. S., I. Experiments with Legume Crops under Irrigation, in *University of Idaho Agricultural Experiment Station, Gooding Sub-Station Bulletin* No. 94, 14 pp. Moscow, Idaho, January, 1917; II. The Management of Irrigated Grass Pastures, *Ibid.*, *Bulletin* No. 95, 17 pp., Moscow, Idaho, January, 1917.

I. The legume crops are among the most important for the irrigated lands of Southern Idaho. The principal leguminous plants grown are: lucerne and clovers, upon which an extensive and growing live stock industry is based; clover seed, peas and beans (field peas are used in pork production). The use of all these crops in upbuilding and maintaining the fertility of the soil of this region has become one of the first principles of agricultural practice in the State. The work which has been conducted at the Gooding Sub-Station with the legume crops has consisted of the testing and comparison of varieties, experiments upon various phases of irrigation practice, and the seeding and cultural management of the most important of these crops. In the irrigation experiments, all water, both on-flow and run-off was carefully measured, all waste water being deducted from the amount supplied.

LUCERNE. Varieties.—During the season of 1910, 11 varieties of lucerne were grown. Very irregular stands were secured, and therefore no data were obtained on the relative yields of the different varieties. The "common" lucerne, which is by far the most extensively grown in Idaho, usually consists of several varieties or strains.

Seeding.—Under ordinary conditions, it was found by experiments that the best results came from sowing 12 pounds per acre. Heavier seedings produced thicker stands, while the seedlings were shorter and less coarse, and came into bloom on an average 3 days later than those grown from the lighter seedings. Only 2 cuttings were

taken; a better quality of hay was produced by the 12, 16 and 20 pound seedlings than by the 4 and 8 pound seedlings. Under ordinary conditions, with a properly prepared seed bed and a sufficient moisture supply, it is waste of seed to use more than 12 pounds per acre. The best results were secured by sowing lucerne with a drill.

Irrigation.—During the seasons of 1910 and 1912, experiments were made with a view of comparing the relative value of the corrugation and the flooding methods for the early irrigation of lucerne. On the plots that were irrigated by the corrugation method the furrows were 30 inches apart. The sowing was done on relatively dry soil and irrigated afterwards. Observations made on this test indicate clearly the superiority of the corrugation method of starting lucerne, as it prevents soil-baking, but later it shows little advantage over the flooding method. On sandy soils and steeper slopes, however, the former system may still be valuable to prevent washing, and to aid in an even distribution of the irrigation water.

The results of this work show that comparatively deep irrigations should be used for lucerne. Under conditions similar to those prevailing at Gooding, the lucerne should receive from $\frac{1}{2}$ to $\frac{3}{4}$ acre-feet per acre in order to secure 3 crops of hay per season. This amount of water can be applied best in 7 or 8 irrigations. More water than the quantity indicated may produce a little more hay, but the increased yield will not justify the extra expense involved.

Seed production.—In general, much less water is required to produce lucerne seed than lucerne hay. The best results are obtained by light frequent applications of water, because they tend to maintain a uniform soil moisture content. The best crop was obtained from rows 35 in. apart.

CLOVERS.—Common red clover is the kind most grown. As regards irrigation, the same system is adopted for clover hay production as for lucerne hay. When grown for seed it is advisable to clip the first growth late in May and afterwards to apply light irrigations. Red clover is an especially valuable crop for use in building up the fertility of new lands.

Alsike and white clover are particularly valuable in pasture mixtures. When grown for seed, the first growth should be allowed to mature the seed crop.

PEAS.—The conditions prevailing in South Idaho favour the production of field peas; the best varieties are: Amraoti, Blue Prussian, Kaiser, and Bangalia. The seeds should be sown at the rate of 90 to 100 pounds per acre. Early sowing is advisable. Under normal conditions, two irrigations give the best results. When mixed with oats, they make a satisfactory hay crop.

They are extensively and profitably used in economical pork production in Idaho.

VETCHES.—*Vicia villosa*, or hairy vetch, is the most productive of the vetches. When grown with oats, it produces a heavy yield of excellent hay. The second growth can be used profitably as a green manure.

FIELD BEANS.—Of all the varieties tried, White Navy is the most satisfactory. Horse beans are valuable as a "hogging off" crop, but for this purpose they are not the equal of field peas.

The climatic conditions which prevail over many irrigated sections of south Idaho do not favour the production of soy beans and cow peas (*Vigna Catjang* or *Vigna sinensis*).

II.—During the last few years the interest in irrigated grass pastures has much increased in southern Idaho, where the conditions are well adapted to grass production. Of all the different grasses tested at the Gooding Experiment Station, the best varieties are: Orchard grass (*Dactylis glomerata*), Smooth Brome grass (*Bromus secalinus*), Kentucky blus grass (*Poa pratensis*), Meadow Fescue (*Festuca pratensis*), and Timothy. Mixtures give better results than any variety sown alone. Different conditions require different mixtures.

A total of 20 to 24 lb. per acre is sown. Grasses can be sown at any time from early spring to the latter part of July; autumn sowing is not advisable. Broadcasting the different varieties separately is the most satisfactory method of sowing. Sowing should be done on well prepared land, and the seed covered lightly. Under average conditions, a nurse crop should not be used. From planting, until the grass comes up, the seed bed must be kept moist. The corrugation method is the best for the first season's irrigation; afterwards, flooding is very satisfactory. Established pastures should be irrigated about every 12 days, the amount of water applied at the Gooding Sub-Station being about 2.25 acre-feet per season. Pastures can be grazed lightly the latter part of the first season. Grazing tests have shown that one acre of good grass will properly maintain two good dairy cows, or three beef steers, without any extra feed, from the end of April to the latter part of September. On an average, the steers gained in weight 732 pounds of beef per acre in one pasture season.

With regard to sheep, it was found that about seven or eight large ewes of the mutton breeds, with their lambs, can be properly maintained on one acre of irrigated pasture. It is advisable to divide the pasture into two or three parts.

814—Wild White Clover (*Trifolium repens*) for Artificial Grass Land; Trials in Different Parts of the United Kingdom.
—The Journal of the Board of Agriculture,

- Vol. XXIV, No. 4, pp. 424-428. London, July, 1917. (2 pp. in Institute Bulletin.)
- 815—The Cultivation of Flax for Fibre in Canada.—ADAMS, J., in *Dominion of Canada, Department of Agriculture, Dominion Experimental Farms, Division of Botany, Bulletin* No. 28, 23 pp. Ottawa, 1916.
- 821—Effect of Sulphuric Acid Sprays on Sugar Beet: Experiments carried out at the Sugar Industry Experiment Station, Prague (Bohemia)—ANDRLIK, K., in *Zeitschrift für Zuckerindustrie in Böhmen*, Year 41, Pt. 10, pp. 685-688. Prague, July, 1917.
- 823—The Effect of Some Alkaline Salts Upon the Fire-holding Capacity of Tobacco.—KRAYBILL, HENRY R. (Contributions from the Hull Botanical Laboratory), in *The Botanical Gazette*, Vol. LXIV., No. 1, pp. 42-56. Chicago, Illinois, July, 1917. (2 pp. in Institute Bulletin.)
- 824—Variety Tests of Vegetables Carried Out at the Maryland Agricultural Experiment Station, United States.—WHITE, T. H., in *Maryland Agricultural Experiment Station Bulletin* No. 204, pp. 231-262. College Park, March, 1917. (3 pp. in Institute Bulletin.)
- 825—Plum-Growing at the Maryland Agricultural Experiment Station.—HOLMES, F. S., *The Maryland Agricultural Experiment Station Bulletin* No. 207, pp. 295-326. College Park, May, 1917. (2 pp. in Institute Bulletin.)
- 826—The Pine Trees of the Rocky Mountain Region.—SUDWORTH, G. B. (Dendrologist), in *United States Department of Agriculture Bulletin* No. 460 (Contribution from the Forest Service, Professional Paper), pp. 1-46. Washington, D.C., May 26, 1917.

LIVE STOCK AND BREEDING

- 828—Poisoning of Cattle by Ragwort (*Senecio Jacobaea* L.) in England.—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 4, pp. 433-436. London, July, 1917.

This note has been prepared by the Chief Veterinary Officer of the Board of Agriculture.

In South Africa, Canada, and New Zealand, much attention has been given to the subject of cattle poisoning by certain species of ragwort. Until the actual cause was discovered, the cases were attributed to a disease which was known under different names (Pictou, Winton, and Molteno disease). It is not generally recognized that the common British ragwort (*Senecio Jacobaea* L.) is poisonous to cattle. This probably arises from the fact that poisoning under natural conditions is a slow process, the action of the poison being cumulative. The actively poisonous agent in the plant seems to be one or more alkaloids which it contains.

In a case recently studied in the Laboratory of the Board of Agriculture, the first symptoms of the poisoning appeared in a herd of cattle 44 days after they had begun to eat dry forage containing much ragwort. The time elapsing between the first appearance of definite symptoms and death varied from a few days up to a month. Some of the animals did not show definite symptoms until twelve days or more after the feeding with ragwort had been discontinued.

The animals suffering from poisoning show signs of nervous disturbance; in some

there may be diarrhœa, but usually there is marked constipation. The principal lesions found are inflammation of the mucous membrane of the bowel; small hæmorrhages are present under the above-mentioned membrane and in the pericardium; in acute cases, the liver becomes altered.

There is no cure for the disease, and prevention resolves itself into removing the ragwort from the forage, or eradicating it from the pastures. The latter may be done (1) by pulling up the plant where circumstances permit; (2) by cutting the plants in the flowering season, that is to say, late in July or early in August, if the operation can only be done once; the cut portions of the weed must be gathered up at once and burnt; (3) the ragwort may be cut early in July and again six weeks later: in which case there is no need to gather up the cut portions; (4) by grazing infested land with sheep in the winter and early spring.

There is reason to believe that ragwort is most poisonous during the flowering season, from June to early August. The question of whether flowering ragwort is poisonous to sheep is now being investigated at the Board's Laboratory. Having regard to the experience acquired in practice of grazing sheep on ragwort pastures during the winter and early months of the year, it would seem reasonable to assume that the practice is not attended by bad results. This is, however, still an open question.

830—Experiments in Controlling Ecto-parasites on Poultry in the United States. (1).—BISHOPP, F. C., and WOOD, H. P., In *Farmer's Bulletin* 801, *United States Department of Agriculture*, 26 pp. Washington, May, 1917. (2 pp. in *Institute Bulletin*.)

831—Experiments to Find a Basal Ration for the Most Economical Feeding of Dairy Cattle under Northwestern Conditions in the United States.—ELLINGTON, E. V., in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin* No. 92, pp. 16-18. Moscow, Idaho, December, 1916.

The experiments undertaken by the Department of Dairy Husbandry of the Idaho Experiment Station to establish a basal ration for dairy cattle under northwestern conditions have been completed.

It has been found that the following ration can be adapted to the high-producing cow or the low-producing cow, and, moreover, may be adapted to animals of different weights: *Alfalfa hay, one part; corn silage, four parts, grain (consisting of barley, four parts; bran, two parts, linseed oil meal, 1 part), one part.*

To show how closely this ration conforms to the standards established by Armsby, the following data are given:—

900-lb. Cow, Giving 20 lbs. Milk, Testing $\frac{1}{4}$ per cent

	Digestible protein	Energy value (calories)
For maintenance.....	0.46	5.70
To produce 20 lbs. milk.....	1.00	6.00
	1.46	11.70
Alfalfa hay 7 lbs., silage 28 lbs., and grain 7 lbs., gives..... lbs.	1.45	11.98
900-lb. Cow, Giving 40 lbs. Milk, Testing $\frac{1}{4}$ per cent.		
For maintenance and milk produc- tion.....	2.46	17.70
Alfalfa Hay 10 lbs., silage 40 lbs., grain 10 lbs., gives..... lbs.	2.48	17.98
1500-lb. Cow, Giving 20 lbs. Milk, Testing $\frac{1}{4}$ per cent.		
For maintenance and milk production	1.65	13.90
Alfalfa hay, 8 lbs., silage 32 lbs., grain 8 lbs., gives..... lbs.	1.89	13.69
1500-lb. Cow, Giving 40 lbs. Milk, Testing $\frac{1}{4}$ per cent.		
For maintenance and milk produc- tion.....	2.65	19.90
Alfalfa hay 11 lbs., silage 44 lbs., grain 11 lbs., gives..... lbs.	2.60	18.84

These rations correspond very closely to the rough rule followed by many dairymen, in feeding one pound of grain daily for every pound of butter fat that the animal produces weekly. The complete set of data secured by these experiments will be published in a "Dairy Farm Management" Bulletin of the Idaho Experiment Station.

(1) See also Bulletin of Foreign Agricultural Intelligence, April 1916, No. 1313.

832—The Mechanical Milker in Dairy-Herd Management in Idaho.—ELLINGTON, E. V., in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin*, No. 92, pp. 16-18. Moscow, Idaho, December, 1916.

The Department of Dairy Husbandry of the Idaho Experiment Station has continued during the past year the dairy herd management investigations. A considerable portion of the time was spent with the milking machine installed for use on the College herd. Data were compiled to show the economy of milk production and the effect on the health of the herd. Attention is being given to the control of the bacterial content of the milk. It is observed that there was no decrease in production during the first eight months in the lactation period of the individual cows as compared with similar preceding lactation periods of the same cows. It was also observed that with the same amount of labour necessary for handling the University herd when milking by hand, the herd could be milked three times a day, with a resulting average increase in milk flow of 22%. This procedure is probably not practical for the farmer who is milking cows as a side line, but for the man who devotes his entire time to dairying, and who is supplying milk for city markets or cheese factories, this is an important factor in the management of the dairy herd. The effect of the mechanical milker on hard-milking cows is worthy of note. Very frequently cows that are capable of high production are not given the attention they deserve because of difficulty experienced in drawing the milk. It has been noted in the case of one pure-bred Holstein cow in the University herd, Philidea Young De Kol, that with the mechanical milker in 1916, during eight months 11,795 pounds of milk containing 360 pounds of butter fat were produced. In 1915, during a similar period with hand milking, 8,001.5 pounds of milk with a fat content of 274 pounds were produced, and during 1914, for a similar period with hand milking, 8,500 pounds of milk, with a fat content of 336 pounds were produced. Machine milking with this class of cattle seems to increase the length of the lactation period, as the average hand milker has a tendency to dry up the cow that he finds difficult to milk.

Close inspection has given each individual animal by the Department of Veterinary Medicine to determine the effect of mechanical milking on the udders. So far no ill effects have been noticed.

Special precautions were taken to keep the machine in perfect repair at all times. The results obtained so far, however, do not warrant an unqualified endorsement of the mechanical milker.

The observations should extend over two consecutive lactation periods.

833—A Study of Leading Breeds of Sheep with Special Reference to Production Factors in Idaho.—IDDINGS, E. J., and HICKMAN, C. W., in *University of Idaho Agricultural Experiment Station, Annual Report, Bulletin No. 92*, pp. 4-8. Moscow, Idaho, December, 1916.

834—Lamb Feeding Experiments (1) in Nebraska.—GRAMLICH, H. J., in *The University of Nebraska, Bulletin of the Agricultural Experiment Station*, No. 153, pp. 1-26. Lincoln, Neb., October, 1916.

Sheep and Pig Breeding in the Argentine Republic at the Present Day.—MARTINOLE, G., Director of the Zootechnical Institute, University of Buenos Aires, in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 9, pp. 1205-1213. Rome, September, 1917.

Sheep Breeding.—There were 67,211,700 sheep in Argentina in 1908, according to the census of that year, and in 1914 the number was 81,485,100. The native sheep of Argentina, called "pampa" and "criolla," are descended from animals brought out by the Spaniards. When wool increased in value early in the 19th century, breeders began to improve the native sheep by crossing with Merinos. But when the frozen meat industry started, early maturing mutton breeds, such as Lincolns, were used in crossing. At present, the breeds most in favour are the Lincoln and Romney Marsh.

The article in the Insitute Bulletin contains several tables giving details of the export of mutton and wool. In the period 1911-15, 480,000 live sheep and 12,217,901 frozen sheep were exported. The number of sheep slaughtered in 1914 for home consumption and exportation was 4,519,350. In 1914, 117,270 tons of wool were exported.

Pig Breeding.—Until recent years very little pig breeding was done in Argentina. Lately, great success has been achieved with the Berkshire and Poland China breeds. The exportation of frozen pork is now becoming very important.

835—Economical Pig Feeding; Experiments made in the United Kingdom.—*The Journal of the Board of Agriculture*, Vol. XXIV, No. 4, pp. 436-439. London, July, 1917.

836—Pork Production Experiments on Field Peas in Idaho.—IDDINGS, E. J., and HICKMANN, C. W., in *University of Idaho Agricultural Experiment Station, Annual Report, Bulletin No. 92*, pp. 6-8. Moscow, Idaho, December, 1916.

(1) See also *Agricultural Gazette*, September, 1917, No. 65.

837—Feeding Experiments to Determine the Relative Efficiency of Vegetable and Animal Protein for Egg Production.—PREN, MOORE, in *University of Idaho Agricultural Experiment Station, Annual Report Bulletin No. 92*, pp. 28-30. Moscow, Idaho, December, 1916.

The relative value of vegetable and animal protein in the ration of laying hens is a subject that is the cause of much discussion among poultry men. Some experimental work has been done, but the question is still an open one. As a means of securing further information, the following experiment was planned and started on November 1, 1915, by the Department of Poultry Husbandry of the Idaho Experiment Station.

Four pens of twenty-five fowls each were fed with the following rations:—

PEN I	
Grain	Mash
10 parts peas,	3 parts bran,
14 parts wheat	3 parts shorts,
6 parts corn,	1 part corn meal,
	1 part wheat meal,
	1 part pea meal,
	6 parts oil meal,
	1 per cent charcoal.
Nutritive ratio 1: 4.2.	

PEN II	
Grain	Mash
6 parts corn	2 parts bran,
10 parts wheat,	1 part shorts,
	1 part corn meal,
	1 part wheat meal,
	3 parts beef scrap,
	1 per cent charcoal.
Nutritive ratio 1: 4.2.	

PEN III	
1 part peas,	1 part bran,
5 parts corn,	1 part shorts,
10 parts wheat,	1 part corn meal,
	1 part wheat meal,
	1 part pea meal,
	3 parts oil meal,
	1 per cent charcoal.
Nutritive ratio: 1: 5.5.	

PEN IV	
6 parts corn,	2 parts bran,
10 parts wheat,	2½ parts shorts,
	1 part corn meal,
	1 part wheat meal,
	1½ parts beef scrap,
	1 per cent charcoal.
Nutritive ratio 1: 5.5.	

The grain was fed in deep litter at the rate of eight quarts a day per one hundred hens, and the mash in open hoppers. The rations were supplemented with green food, grit, shell and bone. In the calculation of nutritive ratios, Idaho analytical data on wheat, bran, and shorts have been used. All other analytical data and digestion co-efficients have been taken from Henry's Feeds and Feeding. The fowls were all trap-nested, and the number and weight of each were recorded. Moreover, the fowls were weighed at the beginning of the experiment on May 1 and again on October 31, 1916, and individual weights recorded. The results of the first year are summarized

in the following table giving the weights of eggs.

Pen	Per cent under 2 oz.	Per cent 2 oz.	Per cent over 2 oz.
I.....	46.5	52.7	.08
II.....	15.2	72.7	12.0
III.....	41.9	56.3	1.8
IV.....	17.5	79.7	2.9

Pen No II. produced 55.8 per cent more eggs than pen No. I., 51.1 per cent more eggs than Pen No. III, and 35.2 per cent more eggs than pen No. IV.

The condition of health and gain in flesh show about the same percentage as that of egg production and weight of eggs. The difference in production between pens I and III and pens II and IV indicates that animal protein is essential for heavy egg production. In the ration of pen No. II. the beef scrap constitutes 37.5 per cent of the mash; in that of pen No. IV. it

constitutes 18.75 per cent of the mash. The fact that pen No. II produced 35.2 per cent more eggs than pen No. IV suggested the advisability of increasing the pen by one whose mash would contain an intermediate percentage (28%) of beef scrap. This experiment with white Leghorn pullets is planned to extend over a period at least three years.

838—Goose Raising in the United States.

—LAMON, H. M., and LEE, A. R., in *U. S. Department of Agriculture, Farmer's Bulletin* No. 767, pp. 1-6. Washington, D.C., February, 1917.

839—On the Factors Governing the Sex of the Eggs of the Honey-Bee.—MORGEN-THALER, OTTO, in *Bulletin de la Société romande d'Apiculture*, Year 14, No. 2, pp. 35-39. Lausanne, 1917.

FARM ENGINEERING

840—The Benedetti Double Brabant Motor Plough.—DESSAISAX, R., in *Journal d'Agriculture pratique*, Year 81, No. 8, p. 145, fig. 2. Paris, April 19, 1917.

841—Mechanical Methods of Cultivation of Vineyards.—RINGLEMAN, MAX, in *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, Vol 127, No. 3, pp. 599-602. Paris, May-June, 1917. 2 pp. in Institute Bulletin.)

842—Apparatus to Prevent Spontaneous Combustion in Hay Stacks.—FORDI, ERNST, in *Deutsche Landwirtschaftliche Presse*, Year 44, No. 49, p. 388. Berlin, June 20, 1917. (2 pp. in Institute Bulletin.)

843—Making Milk Bottles of Paper.—I. *Scientific American*, Vol. XCVI, No. 11, p. 275, 3 figs. New York, March 17, 1917.—II. *Les Inventions Illustrées*, No. 6, pp. 8-9. Paris, June, 1917.

Doctors and health experts in the United States condemn the glass milk bottle as a pernicious germ-carrier. They are demanding that destructible bottles be used for the distribution of milk for the home, so that they cannot be returned to the dairy to be refilled and sent out another time laden, perhaps, with germs picked up during previous use. Pennsylvania was the first state to proscribe the glass bottle as being a continual menace to the public health.

Some dairies of the progressive type had already begun to employ destructible bottles made of light cardboard coated with paraffin. Milk can be kept in a fresh condition in these paper bottles many hours

longer than in the glass bottles, being both air and light tight.

A machine has been invented capable of manufacturing paper milk bottles at the rate of 5000 an hour. It is 90 feet long, and costs over 15,000 dollars. Wood pulp is the raw material employed. The process does not require exclusively high-priced paper pulp; any fibrous wood is said to work equally well. One ton of pulp will produce 60,000 bottles. Owing to the low cost of manufacture, the new paper bottle is said to be cheaper in the long run than the common glass bottles in use at the present time. Only three men are required to work the machine, and from beginning to end the milk bottle is handled only by steel fingers, so that the apparatus meets all sanitary requirements.

The process of manufacture is simple. A steel core is dipped into a tank of raw pulp, and, by means of four clamps, the pulp is pressed round the core into a seamless bottle. During this operation the bottle revolves three times, the clamps pressing at every third of a turn.

The bottle next passes through a powerful drier and over a stencil which prints on it the name of the milk dealer, the capacity of the bottle, etc. It is then removed from the core by a steel hand, and deposited to a belt conveyor which crimps on the bottom and the top. The bottle is then given a paraffin bath that renders it impervious to liquid or acid, and is automatically packed in dust-proof cartons for delivery to the dealer.

The operation is continuous, and it takes about 8 minutes to convert the raw pulp into the completed bottle.

845—Equipment for Farm Sheep Raising.—MACWHORTER, V. O., in *United States Department of Agriculture Farmers' Bulletin*, No. 810, 27 pp. Washington, D.C., June, 1917.

The object of this publication is to furnish a practical guide for equipping farms for sheep raising. Owing to the wide differences in climatic conditions it is not possible to suggest a particular type of building for all parts of the United States.

The above bulletin contains numerous plans of buildings, some showing combinations to contain horses, cattle, sheep, etc., others intended for sheep only; at the same time, scope is left for private initiative to choose the building which is best suited to the particular conditions of the farm in question. Equipment for raising sheep is not expensive. In mild latitudes little housing is required, and the main need is for fencing and for pastures of sufficient number and size to allow frequent changing of flocks to fresh ground to insure health. For enclosing sheep pastures and lots, a fence that will exclude dogs should be used. The dog-proof fence should be 57 inches high, the posts $7\frac{1}{2}$ feet long, set $2\frac{1}{2}$ feet in the ground. Close to the ground should be set a tightly stretched barb wire, next to which is a 36 inch woven-wire fence with 4-inch mesh, and above this three strands of barbed wire. Portable hurdles are illustrated and described.

When winters are longer and more severe, buildings and sheds are necessary to furnish protection from storms, though no special provisions are needed for warmth. Dryness, good ventilation and freedom from draught

are the first requisites of buildings for sheep.

Convenience in feeding and shepherding must also be held in mind in locating and planning such buildings or sheds. Abundance of light is necessary for the health of the sheep.

One square foot of window for each 20 square feet of floor space is necessary. Small flocks can be cared for in sections of barns having stabling or feed storage for other stock, but with a flock, of say, 100 ewes, separate buildings are desirable. The interior arrangements of these buildings should be such as to require a minimum of labour and the least possible moving of the ewes in doing the feeding and caring for them during the lambing season. Ample yard space that is dry and sheltered should be available adjacent to the main barn or shed.

Level and well drained clay-surfaced floors are satisfactory and economical. Concrete floors for alleys and feed rooms are necessary, but it will seldom be called for in the pens.

Instructions are given for the construction of feed racks, wooden grain troughs, etc.; some fixed, and others with moveable parts or completely portable, and the same with automatic feeding arrangements. The descriptions are accompanied by very clear drawings giving all necessary dimensions.

A list is appended to the bulletin containing references to all the publications of the U.S. Department of Agriculture relating to sheep raising.

AGRICULTURAL INDUSTRIES

849—Production of Sugar in the United States and Foreign Countries.—ELLIOT, PERRY, in *U.S. Department of Agriculture Bulletin* No. 473, pp. 70. Washington, D.C., February 12, 1917.

The data presented in this bulletin cover the period from September 1, 1903, when the Brussels Convention came into effect, to the close of the season 1912-1913. The world's production of sugar from beet from cane, the production of the United States, and that of 37 other states and colonies, (1) are examined successively.

I. WORLD'S PRODUCTION.—During the last 20 years the total production of beet and cane sugar throughout the world has

nearly doubled, increasing from 11,000,000 tons' in 1893-94 to 20,000,000 tons in 1912-13. The averages of these two periods show an increase of 34% for beet sugar and 40% for cane sugar. The increase in yield of sugar per ton of beets varies from 8 lb. (0.4%) in France to 40 lb. (2%) in Belgium. The number of beet sugar factories has decreased since 1903 in all countries except Russia and the United States. This decrease is due to the increased capacity of those factories which are still working, and to the improvement of the methods employed. The annual output per factory during the 10 years ending 1912-13 was greatest in Hungary, with 17,610 tons, as against 5,312 tons for Austria, and 6,615 for the Empire. For the other countries, this output reached 7,585 tons for the Netherlands, 7,474 for the United States, 6,170 for Germany, 4,947 for Russia, 3,054 for France, and

(1) Hawaii, Porto Rico, Philippine Islands, Cuba, British West Indies, Mexico, Canada, Costa Rica, British Honduras, Argentina, Brazil, Peru, British Guiana, Paraguay, United Kingdom, Germany, Austria, Hungary, Russia, France, Italy, Belgium, Netherlands, Spain, Denmark, Sweden, Roumania, Switzerland, British India, Java, Mauritius, Japan, Formosa, Straits Settlements, Fiji Islands, Australia, Egypt and Natal.

2,765 for Belgium. The total world area over which beet is grown exceeds 6,000,000 acres, with an average production of 1 ton of sugar per acre of beets. As the average yield of sugar per acre of cane is slightly higher than for beets, it may be assumed that about an equal area of cane is harvested, which would give a total of 12,000,000 acres devoted to sugar growing throughout the world. The yield of beet sugar per acre has varied in the different countries from 1,800 to 3,900 lb., while the cane sugar produced per acre varies from 2,000 to more than 9,000 lbs. At Hawaii and Java, the yield per acre of cane sugar is about 40 tons, as against 20 tons for other countries. During the decade 1903-4 to 1912-13, 78.9% of the world's sugar was produced by 11 countries in the following proportions: 14.5% by British India, 13.6% by Germany, 10.3% by Cuba, 8% each by Austria-Hungary, Java, and Russia, 4.7% each by the United States and France, 3% by Hawaii, and 1.5% each by Belgium and the Netherlands. During this period, Germany produced 28.4% of the beet sugar, Austria-Hungary 18.2%, Russia 17.4%, France 9.9%, and the United States 7.3%. British India produced 27.9% of the cane sugar, Cuba 19.7%, Java 15.6%, Hawaii 5.8%, and the United States 3.9%.

The annual exports of sugar during this period were 1,626,000 tons from Cuba, 1,342,000 from Java, 920,000 from Germany, 755,000 from Austria-Hungary, and 482,000 from Hawaii.

The United States imported 2,743,000 tons as compared with 1,843,000 for the United Kingdom, 147,000 for France, 83,000 for the Netherlands, 35,000 for Argentina, and 13,000 for Germany.

The consumption per head was 112.96 lb. in Australia, 85 in the United Kingdom, 77.6 in the United States, 60.6 in Cuba, 38 in Germany, 30.6 in France, 28.1 in Belgium, 26 in Austria-Hungary, 16.7 in British India, and 14.4 in Russia.

II. UNITED STATES' PRODUCTION.—(1) *Beet Sugar.* The 1909 census shows the beet sugar industry to be localized in three groups of states.

Group I.—Arizona, California, Oregon, and Washington.

Group II.—Colorado, Idaho, Kansas, Montana, Nebraska, and Utah.

Group III.—Illinois, Iowa, Michigan, Minnesota, New York, Ohio, and Wisconsin.

Three states in each of these groups (California, Colorado, and Michigan), together produced $\frac{3}{4}$ of the total sugar beets on an area which, in California, rose from 41,242 acres in 1899 to 83,000 in 1909, from 40,247 acres to 112,232 in Michigan, and from 1,094 acres to 121,698 in Colorado

during the same decade. The total area devoted to sugar beets during the five years 1901-1905 was 228,000 acres, during 1906-1910 it was 374,000, and during 1911-1915, 543,000 acres. The yield of beets per acre increased from 7.2 tons in 1899 to 10.7 tons in 1915.

The production of beets thus rose from 794,658 tons in 1899-1900 to 6,462,000 in 1915-16, representing, in this last year, a value of \$36,919,000; the average price rose from \$4.19 to \$5.67 per ton. The value of beets produced per acre rose from \$30.16 in 1899 to \$54.60 in 1909. In 1909 this value was exceeded by four other crops only: hops, tobacco, sugar cane, and sweet potatoes.

In California, the harvest begins at the end of July and, in the north and central states, at the beginning of October. The average length of the season is 90 days.

The number of factories increased from 30 in 1899 to 73 in 1912, but decreased in 1914 to 60, rising to 67 in 1915. The majority of the factories have a daily slicing capacity of from 350 to 750 tons of beet. Several factories have a daily capacity of 1,000 tons of beets, one a capacity of 2,000, and one a capacity of 4,000 tons. This last factory produces from 400 to 500 tons of sugar daily.

In 1899 the factories planted, on their own land, 17.2% of the area under beets; this figure sank to 11.4% in 1909. In that year, the beets grown in the Pacific Coast group of states had an average sugar content of 18%; those of the Rocky Mountains, 15.1%; and those of the Great Lakes, 16.6%. The capital invested in the beet sugar industry was \$20,141,719 in 1899, rising to \$129,628,938 in 1909. The quantity of beets used was 794,658 tons in 1899 and 3,965,356 tons in 1909; the sugar produced during these years passed from 81,729 to 501,682 tons, and its value increased from \$7,222,581 to \$45,937,629.

The annual average production of sugar for the ten years ending 1912-13 was 448,346 tons as against 77,202 tons for the ten years ending 1902-03, an increase of 480.7%.

The fuel (mostly coal) used in 1909 by these factories amounted to 575,731 tons, plus 554,174 barrels of liquid fuel. The total value of the fuel used, including rent of power, was \$1,899,468.

(2) *Cane Sugar.*—In 1909, cane sugar was grown in twelve states over an area which increased from 386,986 acres in 1899 to 476,849 in 1909; in 1899, 72%; and in 1909, 69% of this area was in Louisiana. The area under cane in 1909 exceeded the area under beets by 112,765, but the production, of beet sugar exceeded that of cane by 167,543 tons.

During the last five years the production of beet sugar has been approximately double that of cane. In 1909, cane was grown on

(1) The ton used in this article is the short ton of 2,000 lbs.

278,233 farms and beet on 35,682. In Louisiana, two crops of cane are grown from one planting, thus the ploughing and planting of cane occurs only every other year on the same piece of ground. Planting begins in September and ends about the first of March. The crop grown from this planting is called "plant cane," that produced from the preceding year's stubble is called "stubble" or "ratoon" cane, and is inferior to the plant cane.

The average yield per acre of cane increased from 10.9 tons in 1899 to 13.1 tons in 1909, and the average value per ton, \$4.89 in 1899, sank to \$4.23 in 1909, the value per acre for these two years being \$53.08 and \$55.40 respectively. Of the total area, 5,276,016 acres, under cultivation in Louisiana in 1909, 30.2% was under maize, 18.1% under cotton, and 6.2% under cane. Of the total value of the crops, 23% was derived from cane, 21.3% from maize, and 22.4% from cotton. Texas produces a small amount of cane sugar, but the cane grown in the other ten states is mostly used for syrup.

Of the 214 cane sugar factories working in 1909, all but ten were in Louisiana; of these, 22 produced syrup only. The average production of cane sugar per factory in 1909 was 1702 tons, as against 8,650 tons per beet sugar factory. In this year, the power of the 214 cane sugar factories was 122,189 horse power, that of 68 beet sugar factories was 57,202.

In 1909, the capital invested in the cane sugar factories was \$38,000,000, the expenses \$26,000,000, and the value of the products \$31,000,000; these figures were \$130,000,000, \$37,000,000, and \$48,000,000 respectively for the beet sugar factories.

There were also, in 1909, 19 sugar refineries in the United States engaged in refining both home-grown and imported cane sugar. They were distributed as follows:—

Louisiana and New York, 5 each; California, Massachusetts, New Jersey, and Pennsylvania, 2 each; Texas, 1. The refineries turned out products valued at \$249,000,000. The production of sugar per ton of cane was 152 lb. in 1914 and 135 lb. in 1915.

Whereas the production of beet sugar gradually increased to 862,800 tons in 1915-16, that of cane sugar, after an average production of 350,000 tons for the ten years 1901 to 1911, decreased rapidly to 137,500 tons in 1915-16.

The production of beet sugar was 6 times greater in 1915-16 than that of cane sugar, which it exceeded in the United States for the first time in 1906-07.

(3) *Maple Sugar*.—The United States and Canada are the only countries for which statistics relating to the production of maple sugar are available. The territory of the United States devoted to this

industry is in the north-east, and extends from the Atlantic coast to Missouri, and from the Canadian border to North Carolina and Tennessee. The first census taken in 1849, gave the production of maple sugar as 34,253,436 lbs. Since then the production of maple sugar has decreased by more than one-half, while that of syrup has trebled. In 1899, 11,928,770 lbs. of sugar and 2,056,611 gallons of syrup were produced; in 1909, these figures were 14,060,206 lb. and 4,160,418 gallons respectively. Estimating the quantity of sugar in one gallon of syrup to be 8 lb., there was, in 1909, a total production of 46,900,000 lb. of sugar.

There were, in 1909, 87,537 farms making maple sugar or syrup, that is, more than 1% of all the farms in the United States. The number of trees tapped in 1909 was 18,899,533, of which 5,586,000 were in Vermont, 4,949,000 in New York, 3,170,828 in Ohio, and 1,298,000 in Pennsylvania. The value of the sugar and syrup produced in 1909 was \$5,177,509, compared with \$2,636,711 in 1899, an increase of 96.4%. The average value per farm was \$59 in 1909 and \$42 in 1899.

IMPORTS AND EXPORTS OF SUGAR IN THE UNITED STATES.—The imports of sugar into the United States are practically all raw. They increased from 1,000,000 tons in 1883 to 2,000,000 tons in 1902, and 3,000,000 tons in 1914. Non contiguous possessions supplied 1,000,000 tons in 1914.

The sugar exports, mostly refined, are sent to the United Kingdom, Central American States, and the West Indies. In 1915, the exports amounted to 275,000, and, for the 12 months ending June 30, 1916, they were 815,076 tons.

The increased production in the United States and its possessions has caused a decrease in imports from abroad; during the last ten years, 1903-1913, this decrease was 46%, as compared with 79% in the preceding decade.

851—Breadmaking Trials in France by the War Administration.—BALLAND, in *Comptes Rendus de l'Academie des Sciences*, Vol. 64, No. 19, pp. 712-714. Paris, May 7, 917.

Since early in 1915, the War Administration has been examining measures with the object of finding substitutes for wheat flour for the preparation of army bread.

Their efforts have been directed to barley, maize, rice, manioc, and ground-nut flours. Chestnuts and potatoes have been disregarded, as every trial since Parmentier has shown that these products are useless for breadmaking.

The following is a summary of the trials effected in the furnace of the Laboratory of the Invalides with the assistance of M. Hennequin. The bread was made according to the rules in use in the military bakehouses.

Barley.—The experiments with 5-10-15-20-25-30% of barley flour were very favourable. The flavour of the barley is only apparent where it forms more than 10% of the bread. The crumb keeps fresh over a long period.

Maize.—Yellow maize flour: above 5% the crumb acquires a yellow tinge; at 10% the colour is more pronounced, and the specific flavour of the maize becomes evident. Form 15 to 20% the bread works well, but requires more care. The crumb is closer.

Rice.—From 5 to 15%, the results are satisfactory. From 15 to 20%, working becomes more difficult; the crumb is more compact and easily crumbles.

Manioc.—With 5-10-15-20% of flour from Madagascar the work is easier than with rice. The flavour of the bread is not affected.

Ground-nut.—The flour prepared at Marseilles, from cakes whence the oil has been expressed, has a disagreeable leguminous flavour, and was, therefore, slightly roasted before being used. At 5% the flavour of the bread is hardly affected; at 10% a taste of rye; up to 15% bread-making presents no difficulty, but above 10% the dough is blackish and very close, like that of rye bread.

Barley and maize; barley and rice; barley and ground-nut.—The trials with a 15% proportion of these products mixed in equal parts, gave a very acceptable product. The barley attenuates the flavour of the maize, and especially that of ground-nut.

To sum up, the incorporation with wheat flour of barley, rye, maize, rice, and manioc flours may, in cases of necessity, be recommended up to a proportion of 10 to 15%. Barley flour should have the preference.

The bread making is favoured by the use of young yeasts obtained only with fine wheat flour. This is exactly what was recommended by Mège-Mouriès in order to obtain semi-white bread from grey flours.

The dough, just before it is put into the oven, contains 46 to 49% of water; the same proportion is found in the crumb twelve hours after the loaves have been removed from the oven. In the crust and in whole loaves the water content was the same as in ordinary army breads.

All these breads keep for the same period of time as army bread.

The nutritive value, according to the following analyses, appears to be intermediate between those for rye and wheaten breads.—

	Water	Nitrogenous matter	Fats	Starch and Fibre	Ash
1*	12.75%	9.10%	1.95%	74.95%	1.25%
2.	12.50	8.95	4.05	73.18	1.32
3.	12.86	9.45	0.20	77.07	0.42
4.	12.60	1.96	0.44	84.20	0.80
5.	5.40	48.56	0.62	40.02	5.40
6.	29.05	9.47	0.14	59.88	1.46 (1)
7.	24.68	7.06	0.20	66.24	1.82 (2)

(1) Of which 0.71 of sodium chloride.

(2) Of which 0.63 of sodium chloride.

*1) Barley flour (bolting 66%).—2) Yellow maize flour (bolting 90%).—3) Chinese rice flour (bolting 95%).—4) Manioc flour received from Madagascar.—5) Ground-nut flour prepared at Marseilles.—6) French army bread (exclusively from wheat flour).—7) Russian army bread (with rye and caraway).

855—The Manufacture of Essential Oils in the United States.—*The Tea and Coffee Trade Journal*, Vol. XXXII., No. 6, p. 520. New York, June, 1917.

856—The Sanitary Control of Tomato Canning Factories.—HOWARD, BURTON J., and STEPHENSON, C. H., in *United States Department of Agriculture Bulletin*, No. 569, 29 pp., II Plates. Washington, June 25, 1917.

857—"Grape Honey."—MARTINOTTI, F. (R. Stazione enologica, Asti), in *Giornale vinicolo*, Year 43, No. 31, p. 362. Casale Monferrato, August 5, 1917.

The author describes a method, discovered by Monti for the preparation of a new product called "grape honey."

The grape must is subjected to two successive treatments; (1) freezing; (2) concentration. The freezing removes the excess of acid, the impurities, and about $\frac{1}{4}$ of the water. Concentration, under

greatly reduced pressure and at low temperature, removes the desired quantity of water either for the preparation of the syrup, or for that of the "honey," a crystallized product with the appearance of honey and the food and therapeutic value of grape juice.

By the Monti method, the must obtained from pressing the grapes and the liquid obtained from the skins are used. By mixing these two liquids, either before or after the freezing, a product is obtained which Monti calls "integral," because it contains all the products of grape juice.

859—The Sterilization of Liquids in Thin Streams by Heat.—STASSANO, HENRI, in *Compte Rendus des Séances de l'Académie des Sciences*, Vol. 165, No. 1, pp. 41-43. Paris, July 2, 1917.

In this method, on which a short note was previously presented to the Académie des Sciences (Vol. 160, Year 1915, pp. 820-822), the liquid passes, under uniform pres-

sure of a compressed, inert gas-nitrogen, through a heating apparatus formed by two super-posed rectangular metal sheets; these are held apart by a paper frame 0.1 mm. thick, which limits the perimeter of the receiver.

Long experience with this method has shown that it gives the following advantages over the usual sterilization methods:—

(1) The liquid may be raised as quickly and as regularly as possible to the desired temperature.

(2) The liquid may be cooled as soon as it has reached the requisite temperature by passing it immediately from the heating apparatus to a cooling apparatus under the same stream of nitrogen. The detrimental effect of heat is thus stopped as soon as its purpose is fulfilled. Neither this last advantage of rapid cooling, nor that of raising the temperature almost instantaneously, can be obtained in a closed vessel.

(3) A large volume of liquid may be dealt with. Sterilization in a closed vessel is always limited by the size of the water-bath or the auto-clave. In the small apparatus (27 cm. x 17 cm.) used by the author, more than 100 litres of physiological solution and 30 to 40 litres of bacterial emulsion may easily be sterilized in one hour without exceeding a pressure of 2 kg. or unduly raising the temperature.

By comparing the results obtained by this method with those obtained by sterilization in closed vessels, it is very clearly seen that the duration of heating is the principal factor in the changes caused by heat in living beings and their albuminoid organic substances. The degree of heat within certain limits, of course, plays only a secondary part.

After giving several examples of the sterilization of cultures, the author states that cow's milk, sterilized at 126° to 128° C. (259° to 262.4° F.) by this method, has neither the colour nor characteristic boiled taste of milk sterilized in bottles in the autoclave at a temperature below 115° (239° F.). A still more remarkable fact is that milk, sterilized in thin streams, even when raised to a temperature of 135° (275° F.), is much less affected by heat where the action of rennet is concerned than milk which has been boiled for a few minutes. Indeed, this milk, whose colour and natural taste show no trace of the test to which it has been put, coagulates with rennet almost as rapidly as fresh milk, and forms a thick coagulum, from which exudes very slightly a perfectly transparent serum, as is the case with fresh milk. The same milk, heated to 100° (212° F.) over the water-bath, gives a slower and less compact coagulum, showing streaks resembling precipitates; the abundant serum is greenish. It is well known that milk sterilized in the autoclave is no longer coagulated by rennet.

The results obtained from the author's many experiments on heating in thin streams are further confirmed by the following fact:—

Milk heated to 75°C (167° F.) for five minutes over the water-bath, that is to say, before the whole mass has reached this temperature, no longer gives the oxidizing and reducing diastase reaction. The same milk heated in the author's apparatus, even to a temperature of 80° (176° F.), still reacts very distinctly to the reagents showing the presence of these enzymes. Only in the case of peroxidase is the reaction somewhat weaker.

860—Paying for Milk in Cheesemaking.—TROY, H. C. (New York State College of Agriculture), in *Hoard's Dairyman*, Vol. LIII., No. 15, pp. 647-649. Fort Atkinson, Wisc., May 4, 1917.

The methods of paying for milk which the larger milk purchasing companies of the United States have put into practice are due to the ordinary variations that occur in the composition of the milk from different herds and the effect of these variations on its economic value.

The percentage of fat and solids not fat found by the chemical analyses, during the past fifteen years, in the milk of 1228 herds, made up of the various breeds and types of cows found in western New York, are as follows:—

Number of herds	Percentage of fat	Average
		Percentage of Solids not Fat
241	3.5 and under	8.243
376	3.51 to 4.0	8.572
331	4.01 to 4.5	8.677
178	4.51 to 5.0	8.858
102	5.01 and over	9.077
1228		

This shows there is an increase in the average percentage of solids not fat for any large number of samples as the percentage of fat increases. The increase, however, for the solids not fat is not at an exactly even rate, nor is it so great as the increase for the fat.

Allowing due consideration for the variations in ratio that will be found in single samples, the assumption is made that, as the percentage of fat increases, there would be an increase in the solids not fat and in the food value similar to that shown in the following table II.:—

TABLE II.—Comparative Value of a Quart of Milk of Different Compositions.

Fat	% Solids Not Fat	Energy Units	Cents per quart (1)
3.0	8.3	604.10	4.0
3.5	8.5	665.46	4.4
4.0	8.7	726.82	4.8
4.5	8.9	788.18	5.2
6.0	9.1	849.54	5.6
5.5	9.3	910.90	6.0
6.0	9.5	972.26	6.4

(1) Value is based on a price of 4 cents quart of milk with 3 % fat.

TABLE VI.—Value of Cheese when Energy Values are Added.

Fat %	Pounds Cheese	Cents per pound	Value of Cheese per 100 lb. milk	Value on Fat Percentage Basis	Difference
3.0	8.30	19.644	\$1.630	\$1.590	—\$0.040
3.5	9.45	19.786	1.869	1.855	—0.014
4.0	10.60	20.066	2.120	2.120	0.000
4.5	11.75	20.156	2.366	2.385	+0.019
5.0	12.90	20.317	2.620	2.650	+0.030

The last column in table VI shows the difference in values by the fat percentage basis compared with a method which gives credit to the yield and food values of the cheese from each grade of milk. The milk containing the lower percentages of fat would receive a few cents less per hundred than an absolutely correct method would give, while the richer grades of milk would receive a few cents more than is due.

In the fat percentage basis method the extra fat of the richer milk, moreover, assists in producing the better flavour, aroma, texture, and palatability of the cheese having a high fat content, and may more than make up for any apparent discrimination against milk of lower fat content, when, in cheesemaking, milk is bought on the fat percentage basis.

861—The Use of Selected Ferments in

Cheesemaking.—GORINI, C., in *Rendiconti del Reale Istituto Lombardo di Scienze e Lettere*, Series II., Vol. L., Pt. 7-8, pp. 302-310. Milan, 1917.

862—The Desiccation of Meat Resulting from Freezing and Cold Storage.—FREIMAN, K., in *Cold Storage Industry*, pp. 339-357. Moscow, November-December, 1916; summary in *Bulletin Mensuel de l'Association Internationale du Froid*, *Bulletin Bibliographique*, Year 8, Vol. 8, No. 1, pp. 8-10. Paris, January March, 1917. (2 pp. in Institute Bulletin.)

863—The Refrigeration of Fruit.—SMITH, EDWIN and CREELMAN, J. M., in *Department of Agriculture, Dairy and Cold Storage Series, Bulletin No. 51*, pp. 2-16. Ottawa, February, 1917.

PLANT DISEASES

865—Decree of the Italian Minister of Agriculture Suspending the Importation of Certain Plants or Portions of Plants into the Kingdom.—*Gazzetta ufficiale del Regno d'Italia*, Year 1917, No. 203, pp. 3749-3750. Rome, August, 28, 1917.

Owing to the importance, during war-time, of not interfering with the importation of food-stuffs or with any of the raw material intended for industrial purposes, and in view of the necessity of preventing the introduction, along with certain products, of parasites or pests dangerous to crops within the realm, the Italian Minister of Agriculture has issued, under date of July 12, 1917, the following decree which entered into force on August 29:—

Sole article.—Article 9 of the ministerial decree of April 25, 1917, is modified as follows:

The importation of the following plants or portions of same is suspended:

(a) Cuttings and rooted cuttings of European and American vines from France, Spain, United States of America and Canada; the existing anti-phyloxera regulations remaining in force;

(b) Live chestnut seedlings from the United States of America.

Fresh fruit of any kind whatever from the following countries: Canada, U.S.A., Chili, Hawaii, Japan, China, Australia, are allowed to be imported under the condition of their being inspected by the delegate for Phytopathology, who must declare the total absence of parasites.

The same regulation applies to citrus fruits and to potato tubers of whatever origin.

872—Grain Mildew (*Sclerospora macrospora*) in the Government of Podolia, Russia.—GARBOWSKI, L., in *Bulletin trimestriel de la Société Mycologique de France*, Vol. XXXIII, Parts 1-2, p. 33. Paris, 1917.

874—Bacterium Phaseoli, Injurious to Field Beans in Michigan, United States.—MUNCIE, J. H., in *Science*, New Series, Vol. XLVI, No. 1178, pp. 88-89. Lancaster, Pa., 1917.

875—Xylaria sp., the Cause of Root Rot in Apple Trees in North Carolina, United States (1).—WOLF, FREDERICK A., and CROMWELL, RICHARD O., in *Journal of Agricultural Research*, Vol. IX., No. 8, pp. 269-276. Washington, D.C., 1917.

INJURIOUS INSECTS

880—The Use of Nicotine Sulphate as a Spray.—MOORE, WILLIAM and GRAHAM, SAMUEL, A., in *Journal of Agricultural Research*, Vol. X., No. 1, pp. 47-50. Washington, D.C., 1917.

The attention of the writers was directed recently to two cases of nicotine poisoning observed at Minnesota (United States), and resulting from the use of greenhouse lettuce. The plants had been sprayed with a commercial tobacco extract containing 40 per cent of nicotine sulphate.

The writers found from their experiments that, while nicotine is volatile, nicotine sulphate is non-volatile. The alkalis contained in hard water and soap set free the nicotine contained in nicotine-sulphate sprays. In order to obtain the maximum efficiency of tobacco extracts containing nicotine sulphates, they should

be rendered alkaline before using. Commercial tobacco extracts containing nicotine sulphate should not be used in the greenhouse, at least not on plants which are later to be used as food. Tobacco extracts, or tobacco papers containing free nicotine, may be safely used in the greenhouse on plants such as lettuce, without danger to the consumer. Food plants, such as lettuce, sprayed with tobacco extracts, should not be cut for the market until the day after spraying. If the temperature of the house is low, a longer period should be given to allow the nicotine to evaporate completely from the leaves.

882—Life History of *Plutella Maculipennis*, the Diamond-Back Moth.—MARSH, H. D., in *The Journal of Agricultural Research*, Vol. 10, No. 1, pp. 1-9. Washington, D.C., July 2, 1917.

AGRICULTURAL ECONOMICS

ORGANIZATION OF FARMERS' MUTUAL FIRE INSURANCE COMPANIES IN THE UNITED STATES

Mutual fire insurance companies in the United States have made very rapid progress. In some States of the Middle West, fully three-fourths of all the insurable farm property are now insured by the farmers' own companies. Companies of this kind are found in every State except Florida, Mississippi, Louisiana, New Mexico, Arizona, and Nevada.

The article in the Institute Economic Bulletin of October, 1917, describes a typical mutual fire insurance company, susceptible of modification to suit the legislation in particular States, and prac-

tising methods which in some points are an improvement on those now in use. The subject is discussed under the following heads: Organization and Administration of the Companies; Insurance Transacting; Essential Provisions of the Model By-laws of a Farmers' Mutual Fire Insurance Company. The last-mentioned section discusses property that may be insured, special inspection of property, limits to the amount of insurance, sale of property and transfer of policy, fees and assessments, and classification.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the October number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

Co-operative Marketing of Agricultural Produce in Canada.....	Page 1-9
Co-operative Sale of Tobacco in Russia.....	14-16
Co-operative Production and Sale of Raisins in California.....	16-18
Activity of the Peasant's Land Bank in Russia (continued).....	34-50
Technical Re-education in France, of Men Mutilated in the War.....	56-66
The Corn Production Act, 1917, in England and Wales.....	67-71
Interior Colonization and the Future of Small Property in Hungary.....	72-76

AGRICULTURAL STATISTICS

CROP CONDITIONS IN ENGLAND AND WALES, JANUARY 1st, 1918

The Crop Reporters of the Board, in reporting on the crops and agricultural conditions on the 1st January, generally state that December proved, on the whole, very favourable for field work, being generally dry with light frosts until towards the latter half of the month, when frost and snow caused some delays, which were most severely felt in the south east. Good progress was accordingly made everywhere, and in the chief corn-growing districts of the east work is at least as forward as usual, if not more so. Nearly four-fifths of the area intended for wheat have already been sown, whereas at the same time last year

only some two-thirds of the wheat area had been got in; and the total area actually under wheat at the end of 1917 was fully 15 per cent greater than a year ago. The young crop everywhere looks promising, although that sown late has received some check from the frosts. Of other autumn-sown crops the area under barley and oats is about the same as at this time last year, that under rye a little greater, and the bean area smaller. All these autumn crops are generally satisfactory. Seeds are, in practically all districts with the exception of the eastern counties, where they are rather patchy, a strong and healthy plant.

NUMBERS OF LIVE STOCK IN THE UNITED STATES

Live stock in the United States on January 1st was valued at \$8,263,524,000, the Department of Agriculture, announces. That was an increase of \$1,527,912,000 over a year ago and the highest on record.

The combined number of all live stock on the farms January 1st was 187,104,000

head, or 6,393,000 more than a year ago, and the largest since 1901, when the total was 192,285,000 and the high mark for farm animals was made.

Numbers of live stock for the last three years are given in the following table:—

	1918	1917	1916
Horses.....	21,563,000	21,210,000	21,159,000
Mules.....	4,824,000	4,723,000	4,593,000
Cows.....	23,284,000	22,894,000	21,008,000
Cattle.....	43,546,000	41,368,000	39,812,000
Sheep.....	48,900,000	48,428,000	48,625,000
Swine.....	71,374,000	67,503,000	67,766,000

BROOMHALL'S FOREIGN CROP CABLE, FEB. 13, 1918

Russia.—Crops are well protected by snow. The general outlook is not favourable, as acreage is smaller than normal and economic conditions are not satisfactory. Railway facilities are inadequate, therefore movement of all cereals are light. Port stocks small.

Balkan States.—Plenty of snow is reported, with weather generally favourable to new crops. Food shortage in parts pronounced. The outlook for corn is favourable.

Italy.—Snow has fallen over a wide area and crop prospects have improved. The outlook is for a moderate yield. Native supplies are scanty and foreign arrivals moderate. Mills operating slowly. Admixture quantities small. Further economy in usage is announced.

Spain.—General fall of snow and rain is reported and the recent drouth has been broken. Heavy frost is reported, but crop

protected. Native supplies liberal and foreign arrivals continue, therefore stocks are well maintained.

North Africa.—The drought has been effectively relieved and agricultural outlook greatly improved. Supplies of wheat and corn liberal and exportation continues.

France.—Snow covers the entire agricultural area. Official reports confirm a generally favourable outlook for new crop. Seeding will be extended when frost disappears. Threshing has been on a liberal scale, but bad roads and snow have prevented any noticeable increase at the mills. Foreign arrivals are increasing. The demand for oats continues unabated.

United Kingdom.—Official and unofficial reports are unanimous in the reports of favourable outlook for new wheat. Acreage large and growth of early seedlings good. Native offers moderate. Foreign arrivals increasing.

DIRECTORY OF THE DEPARTMENT OF AGRICULTURE.

Minister.....The Honourable Thos. Alexander Crerar
 Private Secretary.....T. J. Lynton
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The Dominion Experimental Farms Branch..Director, J. H. Grisdale, B.Agr.

Of the Central Experimental Farm and twenty Branch Farms and Stations distributed over Canada, conducts research and experiments in animal, field, orchard, garden and greenhouse husbandry, distributes superior seeds, analyzes and tests fertilizers and feeding stuffs, studies diseases of plants and administers ordinances for their control, and demonstrates what are of value.

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Encourages and assists in the development of the dairying industry and the improvement of the storage, transportation, sale and trade in agricultural products; administers the Dairy Industry Act (1914), the Cold Storage Act (1907), and the Cold Storage Warehouse Act (1914).

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Encourages the production and use of superior seed, the production of farm and garden crops, tests seed for farmers and seed merchants and administers the Seed Control Act.

The Live Stock Branch.....Commissioner, H. S. Arkell, M.A., B.S.A.

Encourages and assists the development of the live stock industry.

The Health of Animals Branch....Veterinary Director General, Frederick Torrance, B.A., D.V.S.

Administers the Animals Contagious Diseases Act and the Meat and Canned Food Act. Protects Canadian live stock from contagious diseases.

Entomological Branch...Dominion Entomologist, C. Gordon Hewitt, D.Sc.

Conducts investigations on insects in relation to agriculture, encourages the use of methods of prevention and control and administers the Insects and Pests Section of the Destructive Insect and Pest Act.

The Fruit Branch.....Commissioner, Donald Johnson.

Encourages the development of the fruit industry along commercial lines. Also administers Part IX of the Inspection and Sale Act relating to fruit and fruit packages.

International Institute of Agriculture..Commissioner, T. K. Doherty, LL.B.

Supplies Institute at Rome statistics and official information respecting agriculture in Canada and prepares for distribution in Canada corresponding information from countries adhering to the International Institute of Agriculture.

The Publications Branch.....Editor and Chief, J. B. Spencer, B.S.A.

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